INDUSTRIALIZATION AND NATURAL RESOURCES

Household Adaptive Strategies in Java, Indonesia

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INDUSTRIALIZATION AND NATURAL RESOURCES: HOUSEHOLD ADAPTIVE STRATEGIES IN JAVA, INDONESIA

EXECUTIVE SUMMARY

This summary outlines the activities and the findings of a research project was carried out from October 1994 to April 1996. The research was concerned with studying the impact that industrialization is having on the present quality of life of the populations of chosen locations in Java, and the equity and sustainability of its apparent gains.

More immediately, the research investigated the competing demands from large industries and from households for three basic natural resources: water, fuel and animal fodder. Under the overall objective described above, the research followed two broad avenues of enquiry:
The first was the study of the impact of industrialisation on the availability - in quantity and quality - of water, fuel and animal fodder and, consequently, on the established practices through which households ensure access to these resources.

More specifically, the research sought to understand the impact that industrialization had on pre-existing systems of natural resources management, assuming those existed. Alternatively, this may have been a situation where communal institutional arrangements had in fact developed as a reaction to a threat (in this case industrialization) to the availability of the resource.
The main research locations were situated in the province of West Java, in the district of Sumedang, at the periphery of the town of Bandung. West Java was chosen for a number of reasons. The most important is that the process of industrialization in Indonesia has a striking regional concentration

with a large proportion of foreign and domestic investments being centred in West Java.

The second set of locations was the villages of Jetis and Combongan in the district of Sukoharjo, in the province of Central Java. The main reason behind including a second set of locations in the research is broadly comparative. This would not amount to setting up a precise parallel between the two sites. Rather, the interest was in identifying similarities and differences with a region and villages which differ from the previous ones in that they are less industrialised.

The research was carried out using a combination of research methods.

Secondary Data Collection

In its initial phase, the research concentrated on the study of secondary data of different types:

- published material on patterns of industrialisation, on environmental issues and on the relation between the two; anthropological accounts of household and gender relations in the country.
- official documentation on the speed and scope of industrialisation in Java; official documents on environmental characteristics and changes in the regions chosen;

Primary Data Collection

The collection of primary data involved:

- observation,
- unstructured interviews,
- a sample survey,
- focus group discussions,
- case studies.

This research has confirmed what has been found in several other parts of Java and beyond. Fast and widespread industrialization brings considerable gains to local communities, in terms of new employment opportunities and of improvements of infrastructures. However, not everybody enjoys equal access to these opportunities. The research also confirmed that, as in other similar areas, industries cause serious and perhaps irreversible damage to the natural environment. In particular they cause decrease and deterioration of resources which are essential to the physical and social wellbeing of the local people.

Households living in such communities develop diverse strategies to solve the problems caused by industrialization, either directly or indirectly. The implication of such strategies cannot be said to be universally more positive or negative for women than for men This research has shown work in the factories to be important for women because it provides regular earnings higher than those available from most other occupations. It is clear, however, that women remain responsible for what are perceived to be their traditional tasks in relation to water, fuel and fodder. While women have adjusted to new opportunities by taking on board more responsibilities, the spectrum of tasks for which men are responsible has remain the same and, in some cases, has diminished.

Equally complex are the outcomes in terms of the impact of industrialization on perceived economic value of children, since the continued reliance on their help may militate in favour of a desire for large families while the difficulties of combining factory work with child-care may militate against it.

Issues concerning the impact of industrialization on common property resources management were only secondary to the research, but here too the impact of industrialization had many negative aspects.

For all the issue the research has covered, there are very clear indications that industrialization is not an unmitigated good. Local people, as individuals, households and civil associations, actively seek to stem the worse impacts and benefit from the best. In this, it is important that they should receive as much protection and support from authorities at all levels, to ensure that damages are reduced to a minimum and gains are both equitable and sustainable.

INDUSTRIALISASI DAN SUMBERDAYA ALAM: STRATEGI ADAPTASI RUMAH TANGGA DI JAWA, INDONESIA

RINGKASAN

Ringkasan ini mencoba menggambarkan kegiatan dan temuan proyek penelitian yang telah dilaksanakan sejak Oktober 1994 hingga April 1996. Pada intinya, penelitian ini sangat menaruh perhatian pada pengkajian dampak industrialisasi terhadap mutu hidup penduduk di berbagai lokasi tertentu di Jawa, serta dampaknya pada pemerataan dan kesinambungan dari hasil yang diperoleh.

Secara spesifik, penelitian ini dimaksudkan untuk mengkaji fenomena persaingan kebutuhan antara industri besar dengan rumah tangga dalam tiga sumberdaya dasar, yaitu: air, bahan bakar dan pakan ternak. Dengan tujuan seperti yang dinyatakan di atas, dapat dinyatakan bahwa penelitian dilakukan untuk mengetahui dua hal utama, yaitu:
Pertama, mengkaji dampak industrialisasi terhadap ketersediaan -- baik mutu maupun jumlah -- air, bahan bakar dan pakan ternak, dan selanjutnya adalah pada cara bagaimana rumah tangga menjaga aksesnya terhadap sumberdaya-sumberdaya tersebut.

Kedua, secara lebih khusus, penelitian bermaksud memahami dampak industrialisasi terhadap sistem manajemen sumberdaya yang telah ada sebelumnya, tentunya dengan asumsi bahwa manajemen yang demikian memang telah pernah ada. Sebagai alternatifnya, mungkin terdapat situasi dimana tatanan kelembagaan masyarakat telah bereaksi atas ancaman (dalam hal ini industrialisasi) terhadap ketersediaan sumberdaya tersebut.

Lokasi utama penelitian adalah di sebuah desa di pinggiran Kota Bandung namun merupakan wilayah Kabupaten Sumedang, Jawa Barat, yang dipilih atas dasar berbagai pertimbangan. Pertimbangan yang terpenting adalah karena proses industrialisasi di Indonesia telah menyebabkan terjadinya pemusatan investasi nasional maupun asing di wilayah Jawa Barat.

Lokasi kedua adalah Desa Jetis dan Desa di Kabupaten Sukoharjo, Propinsi Jawa Tengah. Alasan dimasukkannya set kedua lokasi tersebut tidak dengan maksud untuk membuat suatu kesejajaran dengan kasus pertama, melainkan untuk mengidentifikasikan keserupaan dan perbedaan antar-propinsi dan antar-desa yang agak berbeda dengan kasus pertama, yaitu dimana kasus kedua lebih sedikit mengalami industrialisasi.

Penelitian dilakukan dengan menggunakan kombinasi beberapa metode penelitian antara lain:

- Pengumpulan data sekunder
- Pengumpulan data primer, yang dilakukan melalui:
  - pengamatan
  - wawancara tak-terstruktur
  - survai sampel
  - diskusi kelompok terfokus (*focus group discussion*) dan
  - studi kasus

Penelitian ini telah berhasil mengkonfirmasikan apa yang telah ditemukan di berbagai bagian Pulau Jawa dan di tempat lainnya. Ternyata industrialisasi yang berlangsung cepat dan tersebar telah menyebabkan perubahan cukup besar bagi masyarakat setempat, terutama dalam ukuran peluang lapangan kerja baru dan perbaikan prasarana. Namun demikian, tidak semua orang berhasil dan berkesempatan memperoleh akses yang sama terhadap kesempatan tersebut.

Penelitian ini juga mengkonfirmasikan bahwa --- sebagaimana terjadi di wilayah lain --- industri menyebabkan kerusakan serius bagi sumberdaya alam dan bahkan mungkin tak-terkembalikan (*irreversible*). Secara khusus hal demikian menyebabkan penurunan dan perusakan sumberdaya yang sangat esensial bagi kehidupan fisik dan sosial dari masyarakat setempat.

Rumah tangga yang berada di dalam masyarakat yang demikian biasanya akan mengembangkan strategi-strategi pemecahan masalah baik yang secara langsung maupun tak-langsung disebabkan oleh industrialisasi. Implikasi dari strategi demikian secara universal tidak dapat dikatakan bersifat lebih positif maupun lebih negatif bagi perempuan dari pada laki-laki. Penelitian ini berhasil menunjukkan bahwa bekerja di pabrik memiliki arti penting bagi perempuan karena mampu memberikan perolehan yang relatif lebih tinggi dan pasti daripada sebagian besar pekerjaan lainnya. Namun demikian sangatlah jelas, bahwa perempuan tetap harus bertanggungjawab atas kegiatan yang selama ini dipersepsikan oleh masyarakat sebagai "pekerjaan" perempuan, misalnya untuk hal-hal yang berkenaan dengan air, bahan bakar, dan pakan ternak. Sementara di satu sisi perempuan telah beradaptasi terhadap peluang baru yang diperolehnya dengan jalan memperbesar tanggung jawab yang harus dipikulnya, di sisi lain spektrum tugas yang menjadi tanggung jawab laki-laki masih tetap sama, atau dalam beberapa kasus bahkan mengecil.

Yang sama rumitnya adalah keluaran dalam pengertian dampak industrialisasi terhadap nilai ekonomis anak, karena dengan terus mengandalkan kepada bantuan anak berarti akan mempertahankan -- bahkan dapat meningkatkan -- keinginan untuk memiliki keluarga besar, sementara kesulitan dalam mengkombinasikan kegiatan sebagai pekerja pabrik maupun sebagai pengurus anak, tentunya akan lebih memperburuk keadaan.

Masalah-masalah yang berkenaan dengan dampak industrialisasi terhadap pengelolaan sumberdaya milik bersama dalam penelitian ini hanya bersifat sekunder, walau begitu dalam hal ini pun industrialisasi memiliki banyak aspek negatif. Untuk semua masalah yang telah diliput oleh penelitian ini, terlihat indikasi bahwa industrialisasi bukan sesuatu hal yang begitu saja bersifat baik. Penduduk lokal, termasuk pribadi-pribadi, rumah tangga dan perhimpunan masyarakat secara aktif telah berupaya meredam dampak negatif dan memanfaatan peluang yang mungkin diperoleh. Dalam keadaan demikian, akan sangat penting artinya apabila mereka dapat memperoleh lebih banyak perlindungan dan dukungan dari penguasa di setiap tingkatan, guna menjamin agar kerusakan dapat dikurangi seminimal mungkin dan mereka dapat memperoleh keuntungan secara merata dan berkesinambungan.

FOREWORD

It is with great pleasure that I introduce Ines Alessandra Smyth's research report, entitled "Industrialization and Natural Resources: Household Adaptive Strategies in Java, Indonesia", which is now available as an AKATIGA Foundation publication, since our collaboration dates back to the late 1980s.

Ines Smyth, who obtained her Ph.D. in Social Anthropology from University College London (1986), is deeply interested in the role of Indonesian women in small scale industries. Her Ph.D. thesis was based on a case study in rural West Java.

This particular study focuses on the impact of industrialization upon rural areas and more specifically on how households obtain access to water, fuel, and animal fodder.

Industrial expansion towards rural areas appears to have a direct and an indirect impact. The former implies competition between industries and the rural population regarding access to the above natural resources, whereas the latter stems from the increased demand for such resources, generated by the influx of settlers and workers from outside, resulting in keener competition within a larger population.

Ines Smyth, tried to trace how local institutions in search of appropriate solutions manage and regulate the utilization of increasingly scarce resources. She intelligently and sharply analyzes the household adaptive strategies, which are aimed at ways to overcome the problems now faced.

Ines Smyth

ACKNOWLEDGEMENT

This work is the outcome of a collaborative process in which many institutions and individuals participated. The research was made possible by funding provided by the Overseas Development Administration. The overall initiative was managed by the Development and Project Planning Centre in Bradford, where the sympathetic supervision of Carolyne Dennis and Lesley Knight was greatly appreciated. I am grateful to the London School of Economic (and especially Amanda Bullock) for 'hosting' this project, and to Oxfam for allowing me to continue the work. In Indonesia the

organizations which made the project possible are many: the administrations of all the communities and the officials at all administrative levels which granted permits and information; the academic institutions which shared their documents; the factories which opened their doors, and The Institute of Technology, Bandung for hosting the final workshop. To all of those I wish to express our gratitude.

Some individuals were especially important: Joan Hardjono for translation and editing efforts, Purna Sen for the statistics and the good humour, Kurnya Roesad for the interest, Yulfita Rahardjo and her staff at The Indonesian Institute of Sciences for their support.

My warmest thanks go to the people of Cintamulya, Cisempur, Jetis and Combongan. Their forbearance, warmth and interest are the single most important contribution to this work. My hope is that this research may bring some good outcomes for all four communities.

Finally, I wish to acknowledge the fact that the experience of working with Hetifah and her team at Akatiga and with Nur and Yayuk, all of whom have put enormous enthusiasm, professionalism and hard work into this research, has strengthed my respect for their professional and personal qualities and my hopes for a continued and fruitful friendship. This is our research, though any mistakes, inconsistencies and gaps are entirely mine.

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CHAPTER 1

RESEARCH AIMS AND METHODOLOGY

1.1 Introduction

> *They came to a land blessed with sunshine and covered with dense tropical forest, rich in fauna and flora' (Lubis 1987:xvi)*

This book documents the activities and the findings of a research project sponsored by the Overseas Development Administration (UK) as part of the research programme on 'Links Between Population and the Environment'. The research project was carried out from October 1994 to April 1996[1], as a collaboration between the principal researcher, Dr Ines Smyth, based at the London School of Economics, and two Indonesian non-governmental organizations (NGOs)[2], AKATIGA in Bandung and Gita Pertiwi in Solo[3].

The book is divided into five chapters. The first contains an explanation of the central questions of the research, its methodological approach, the choice of locations, and a description of some of its dissemination activities. The second chapter gives a summary of the development strategies adopted

1 See Appendix A for a time table of the project activities.

2 During the first six moths of the project, collaboration had been established with an organization based in Jakarta. Due to slow progress, alternatives had to be found, causing some delay to the project.

3 In AKATIGA the researchers directly involved were: Hetifah Sjaifudian as local coordinator, Dianto Bachriadi, and Popon Anarita (Okol). The researchers from Gita Pertiwi were Sri Wahyuningsih and Tri Hastuti Nur Rohimah. Purna Sen took care of data processing and analysis in the UK.

in Indonesia in recent decades, with specific focus on industrialization. It also describes the main environmental problems experienced in the country, and the conditions under which water, wood fuel, and animal fodder can be found in Java. Chapter 3 presents the most relevant characteristics of the research sites in West Java, including the environmental changes caused by the arrival and expansion of large industries. Chapter 4 gives broadly similar information for the Central Java locations. Finally, Chapter 5 summarizes the ways in which local households have adapted to altered environmental and social conditions, with particular attention to gender relations. Interhousehold arrangements for the management of natural resources are also considered. This chapter also summarizes the implications of research the findings for an understanding of the relations between industrialization and natural resources at the micro level.

* * * *

Indonesia is endowed with an extraordinary variety and richness of natural resources, including 10 per cent of the earths tropical forests. But ecological conditions in both rural and urban areas are seriously threatened by a variety of factors (Hill 1992; World Bank 1994), especially on the island of Java. In the relevant literature, environmental deterioration in Java is often understood in fairly simplistic terms: overpopulation leads to erosion and deforestation through excessive land use. It also leads to the need for industrialization, and its attendant problems of air and water pollution (Donner 1987).

This research intended as it was to go beyond an approach which prioritises demographic processes, established as its point of departure the economic policies which have propelled the country along an extremely fast industrialization path. Ultimately, the research was concerned with studying the impact that industrialization is having on the present quality of life of the populations of chosen locations in Java, and the equity and sustainability of its apparent gains. The interest in the relationship between economic policies, environmental conditions and social change at the local level arises from a sympathy with the notion that the preoccupation with global environmental changes runs the risk of marginalizing issues of poverty and livelihood in developing countries (Leach and Mearns 1991).

More immediately, the research investigated the competing demands from large industries and from households for three basic natural resources: water, wood, fuel, and animal fodder. The choice of these three resources[4] was dictated by the necessity of narrowing the scope of the research to manageable proportions. It does not deny the importance of other resources, such as sunlight, climate and air, for the well-being of the local people and in their evaluation of the magnitude and meanings of recent socio-economic changes. Land, its ownership, distribution and use, was considered part of the socio-economic conditions against which current changes are taking place. Hence it was accorded a role in the analysis which is more all-embracing that those of the other resources.

1.2 Research questions

Under the overall objective described above, the research followed two broad avenues of enquiry:

a. Industrialization and adaptive household strategies

The first was the study of the impact of industrialization on the availability - in quantity and quality - of water, fuel and animal fodder and, consequently, on the established practices through

4 According to Omara Ojungu (1992) the very concept of natural resources renders difficult the inclusion of resources for which quantities and values cannot be easily measured.

which households ensure access to these resources. It was anticipated that such impact would be both direct and indirect.

The direct impact of the arrival and expansion of factories would be either through the competing use such enterprises made of available resources for their productive processes, relying on more advanced techniques for their exploitation, or through the damage caused to the natural environment by industrial pollution.

The indirect impact would stem either from the increased demand for such resources generated by the large numbers of immigrants attracted to rapidly industrializing areas by the prospect of employment, or from the competing demands that employment in the factories would generate on the time and energies of workers drawn from the local population, especially women.

In the research the notion of the household as monolithic and undifferentiated (Dwyer and Bruce 1988; Folbre 1994) was rejected. Instead, ‘household strategies’ were understood as the different contributions made by each household member to the daily activities through which such resources are obtained and put to use. Social norms in Java dictate that women, men and children are responsible in different ways for the collection of water and fuel for household needs, and of fodder for cattle, as well as for other productive and reproductive tasks (Smyth 1986). Thus adaptive strategies were expected to be differentiated along both gender and generational lines. As a consequence, the research tried to assess whether industrialization and its impact on the three natural resources were leading to shifts in the respective work loads of husbands and wives, and between household members of different generations, and what the nature of such shifts may be.

Because of this notion of 'household', the research considered that such shifts may be the outcome of conflicts and bargaining between household members rather than of unanimous and consensual decisions. At the societal level, too, it was envisaged that industrialization may result in the appearance or increase of specific social problems, not yet identified.

A component of this aspect of the research was the impact that changes in these strategies could have on reproductive ideas and behaviour. It is commonly agreed that where children contribute to the economic functions of the household, this encourages high fertility (Nieuwenhuys 1994). In Java, such contribution is amply documented and includes the tasks related to the collection of natural resources for domestic use, as mentioned above (White 1976; 1992). The research intended to document, as far as possible, whether the processes of industrialization is influencing reproductive behaviour as a consequence of:

- the creation of new employment opportunities for both women and children;
- the shifts in intra-household responsibilities for natural resources.

It should be remembered here that, although fertility has declined considerably in the whole of Java since 1972, bringing the average number of children per woman from 5.5. to 2.3, the western part of the island still displays higher fertility levels and lower contraceptive acceptance rates than the rest (Population and Policy 1989).

b. Industrialization and Common Property Resource Management

The bulk of the research addressed its questions at the level of the community (the general impact of industrialization on availability and use of natural resources), and also at that of intra-household relations (shifts in gender and generational responsibilities as part of household adaptive strategies). In addition, a smaller component of the study looked at the intermediate level of inter-household relations, in connection with the management of common property resources. More specifically, the research sought to understand the impact that industrialization had on pre-existing systems of natural resource management. The 'tragedy of the commons' position assumes disastrous consequences for all resources which are commonly owned, because of the tendency of individuals to exploit them without bearing the costs for their maintenance. This view has been challenged by those who believe that it is possible to have local institutional arrangements which safeguard common property (Uphoff 1986). This approach necessitates making a distinction between common property, where resources are communally owned and managed through communal arrangements, and open-access, where the resource is not owned by anyone and hence is liable to depletion or deterioration (Berkes and Farvar 1989).

It was also the intention of this research to establish whether institutional arrangements for the management of common resources existed in the research sites, and whether industrialization was bringing radical changes to those arrangements. Alternatively, there may have been a situation, as suggested by Gibbs and Bromley (1989), where communal institutional arrangements had in fact developed as a reaction to a threat (because of industrialization) to the availability of the resource. Finally, it was hoped to assess whether such changes heralded better or worse prospects for the equitable and sustainable use of the relevant resources.

1.3 Gender Considerations in the Research

A further aspect of the research deserves mention, namely the place given to gender issues. Very often in the development literature a professed interest in gender reveals itself to be a focus on women. That this approach ignores men is only the least of its many problems. Its main flaw lies in that it precludes a serious analysis of the role that gender has in shaping social relations at all levels. In this research our interest was in the gendered nature of the processes through which industrialization was leading to considerable reshaping of the use and management of natural resources at the local level.

The literature which links gender to environmental issues is of relatively recent date, but is already rich in debates and valuable insights. The position concerning the special relationship that women have with the natural environment (Shiva 1988), which makes them the main victims of environmental depletion and degradation because of their responsibilities for reproductive activities as well as the most effective environmental managers, has been amply challenged (Jokes, 1995) on many counts. Of interest to this research are some of the ideas which emerge from this critique:

- The first is that it is not possible to state in abstract and absolute what the practical involvement of either men or women (or children) with natural resources in a given social context is; thus this must be a subject for research.
- The second is that it is not correct to assume that changes in resource availability will take place in a situation of a fixed division of labour (Jokes 1995). This is a notion very central to the main aim of this research, which has attempted to document exactly the changes that problems in the availability and access to natural resources have brought to the gender (and generational) division of labour dominant in the region.
- The third is that it is dangerous to consider nature as synonymous with the environment, as if natural resources available to people were always in some pristine form, untouched by human intervention (Jokes, 1995). Furthermore, what in nature is perceived as a resource is socially determined (Grima and Berkes 1989); consequently

different social groups may see changes either as positive or negative. In the research this was kept in mind when trying to study the distinct ways in which not only men and women but also people of different ages and marital status adapted to the changes.

In exploring these ideas, the research also sought to contribute to contemporary critiques of the so-called Women in Development (WID) and similar approaches to gender in the context of development, for their portrayal of the women of developing countries as always and uniformly poor and subordinated and as the powerless and passive victims of both micro and macro social forces which they cannot control or even understand.

In summary the research concerns:

– the impact that industrialization is having on the availability (in quality and quantity) of three main natural resources: water, wood-fuel and fodder in the rural or peri-urban communities under study;
– the adaptive strategies of households using such resources, and the implications for relations within households in terms of gender and generational allocation of responsibilities and tasks. An element of this is possible changes in the perceived value of children and hence in reproductive perceptions.
– the possible changes in formal and informal arrangements among local households in the management of common property resources.

1.4 Research Methodology

There are several aspects of the methodological approach to this research which need to be explained, as they have implications for the kind of information and analyses which were generated, as well as for the use the latter may be put to. These concern respectively the forms of collaboration through which the research was carried out, the choice of locations for the field research and the techniques adopted for the collection of information.

1.4.1 Collaboration as participation

In the field of development one of the most widely used terms is that of participation. A participatory approach is generally advocated in development research as well as practice as both a means and an end. Participation is an end to itself because through its processes people - and especially those who are poor and marginalized - are said to acquire control over either knowledge or material resources; it is also a means because it guarantees more accurate information and an 'insider view' of the issues at hand, or a more efficient and effective implementation of practical development projects (Pratt and Loizos 1992).

But, as is the case with many overused terms, that of participation too has become both blurred and contentious. Sceptics often point out, among other problems, that the social stratifications present in most societies result in forms of 'participation' which simply reflect hierarchies and inequalities (Mikkelsen 1995) and which will be duplicated in the knowledge created by or in the benefits accruing from development activities.

A participatory approach is often associated with the work of non-governmental organizations. However, as for participation more broadly, the assumption that the activities of such organizations are always based on participatory principles and practices has been rightly challenged. Despite, or rather, because of these warnings, the notion of participation chosen here is one which is directly linked to the collaboration instituted with counterparts for the purpose of this research. It is necessary here to clarify the role that NGOs play in contemporary Indonesian society.

In the last two decades NGOs in Indonesia have grown steadily in number and are now in their thousands; they have also grown in the recognition they receive from foreign donors and international financial institutions such as the World Bank (Ganie 1995). There has also been another change: while NGOs have for a long time been involved in activities related to the implementation of small development initiatives, many are now moving towards advocacy efforts at various levels (van Tuil and Witjes 1993). These ngos have become particularly active in the field of environmental advocacy and education, supporting communities in the affirmation of their rights. Some of the most effective have been able to make inputs even to the basic environmental law passed in Indonesia in 1982, the Environmental Management Act (Demo 1993).

Although NGOs are subjected to many forms of official control, they enjoy some freedom from restrictions, because they are excluded from the 1985 Laws on Social Organization (Undang Undang Organisasi Kemasyarakatan or ORMAS)(Overweel 1993), through which the state rules and contains the activities of the institutions of civil society.

Thus, in a context of acknowledged and widespread restrictions over popular participation and over the autonomous formation of civil society associations, NGOs in Indonesia are said to represent mechanisms both for some poverty alleviation - with the provision of social services, especially in rural communities - and for popular participation (van Tuil and Witjes 1993). Though surrounded by uncertainties about their future, and their appropriate roles and strategies, NGOs are seen as providing the most viable tool to strengthen civil society:

> *Although still vulnerable to government control, ngos could provide a basis for the emergence of political*

> *actors able to establish autonomous sources of influence outside the state, and thus lead to a more participatory politics (Mas'oed 1989:24).*

This is where the participatory aspect of the research lies for, in working with local NGOs, this research hoped to be part of the process through which such organizations can contribute to increased popular participation in society at large. But collaborative research can be contrary to all principles of participation. The type of collaboration is relevant here and should be explained. The form of collaboration established for this research had three central features:

- the conduct of the research was jointly devised;
- the research process was also an opportunity for improving the capabilities of the members of the NGOs through training and direct involvement in new types of research activities;
- the knowledge generated by the research was jointly owned and, in the first instance, used for specific dissemination purposes.

More detailed information on the three features will be given below, while others will emerge from the later descriptions of the research techniques employed and of the dissemination activities undertaken (see 1.4.3).

As already said, the research project was carried out in collaboration with two Indonesian non-governmental organizations rather than with an academic institution. They were: AKATIGA, a research foundation based in the city of Bandung in West Java, and Gita Pertiwi, based in the Central Javanese city of Solo. Both organizations are involved in research, and both have a commitment to activities which strengthen the position of weak social groups, through their work in dissemination and advocacy. The first specializes in matters related to labour and industrial relations, land matters and small business issues, the second in matters related to environmental issues and gender.

Although the initial proposal for the research was generated by the principal researcher, the first of the two organizations (and the second to a lesser extent) was instrumental in redefining the terms of the research, developing its data gathering and processing methodologies, and disseminating the findings through the means described below. Periodical meetings and regular contacts via telephone, fax and electronic means ensured a continuous dialogue between all researchers. These exchanges often embraced issues and activities beyond the scope of the present research.

1.4.2 Research Locations

The main research locations were situated in the province of West Java (see Map 1), in the district of Sumedang, on the periphery of the city of Bandung. West Java was chosen for a number of reasons. The most important is that the process of industrialization in Indonesia has a striking regional concentration, with a large proportion of foreign and domestic investments being centered in West Java, especially in the regions of Tangerang and Bandung (Bappeda 1988). The impact of such changes on the physical, cultural and economic environments of these two regions has been dramatic. One feature has been the transformation of rural into urban or semi-urban communities, reflecting the influx of migrants (Sajogyo and Wahyuni 1992)[5].

A second reason for this choice lies in the fact that most of the researchers, including the principal researcher and those of AKATIGA, had experience and knowledge of the region because

5 A more detailed discussion of the features of the region, as related to this research, is contained in Chapter 2 of this report.

of involvement in previous research activities. In particular, many had been associated with a long-term project on 'Employment and Productivity in the Nonfarm Sector', which had generated considerable information at the micro level[6].

The specific sites for the field research were selected following certain basic criteria:

- widespread and relatively recent industrialization, in the shape of large scale enterprises;
- the opportunity to observe conditions prior to the establishment of the industries;
- reasonable accessibility both physically and in the form of openness to outsiders.

After a number of visits to alternative locations, the villages of Cintamulya and Cisempur, in the sub-district of Cikeruh were chosen (see Map 2) as satisfying the above criteria[7]. The first of the two villages had been engulfed by the expansion of factories for some time, while the second was still being recently drawn into the same process.

The second set of locations was the villages of Jetis and Combongan (see Map 4) in the sub-district of Sukoharjo, in the province of Central Java (see Map 3). There were two reasons for including a second set of locations in the research. The first was broadly comparative. This did not amount to setting up a precise parallel between the two sites, since too many variables would have had to be taken into consideration. Rather, the interest lay in identifying broad similarities and differences in

6 The West Java Rural Nonfarm Research Project was a collaborative project between the Institute of Social Studies (ISS), The Hague, the Development Studies Centre, Bogor Agricultural University, and the Centre for Environmental Studies, Bandung. The co-ordinator was Prof. B. White of the ISS.

7 Detailed information on the villages is given in Chapter 3 and 4 of this report.

villages which differ from the previous ones in that they are much less industrialized.

A second reason for the inclusion of Central Java location relates to the desire to extend to a second NGO (Gita Pertiwi) the type of 'collaboration as participation' described above. This latter reason also influenced the choice of the location. Gita Pertiwi was already engaged in activities in the chosen villages, which rendered their research tasks not only easier but also of value to their continuing involvement with the communities in question.

1.4.3 Research techniques

The research was carried out using a combination of methods. This choice was not aimed at method triangulation to check on the validity of data obtained by the different means. Rather, it was felt that each of the techniques selected would offer information of a certain type (qualitative, quantitative, factual, or attitudinal), each providing one facet of a complex, though not exhaustive, picture. In addition, the opportunity to engage in different research activities requiring a variety of skills was considered part of the process of formal and experiential learning in which the NGOs were engaged, as explained above.

Secondary Data Collection
In its initial phase, the research concentrated on the study of secondary data of different types:

– published material on patterns of industrialization, on environmental issues and on the relation between the two; anthropological accounts of household and gender relations in Indonesia. This part of the research was carried out both in the UK and in Indonesia.

– official documentation on the speed and scope of industrialization in Java; official documents on environmental characteristics and changes in the regions chosen for study.

This approach resulted in the preparation of two internal reports, by Kurnya Roesad and Harry Seldadyo, respectively. Portions of the present report, especially Chapter 2, rely on the information contained in the two documents.

Primary Data Collection

The second stage of the research from September to December 1995 involved the collection of primary data, using:

- observation
- unstructured interviews
- a sample survey
- focus group discussions and
- case studies.

As part of the fieldwork preparation, discussions had been held on the means by which a gendered perspective of the project could be reflected in all research techniques. These concerns covered the choice of field researchers and interviewers, the selection of respondents, the contents of questions, the conduct of interviews (in terms of time, place and duration), data processing and the nature of dissemination activities.

(1) Observation

Observation was carried out by protracted periods of residence of one researcher (in Bandung), and repeated visits to the location by all researchers (in both Bandung and Solo). Through observation, the researchers were able to acquire first-hand knowledge of the physical characteristics of the localities. This was also a means through which researchers became known to the communities or renewed their acquaintance with them, thus ensuring a degree of familiarity and trust[8].

8 This familiarity also facilitated the periodical visits of the principal researcher, which were, of necessity, brief.

(2) Unstructured interviews
A number of unstructured interviews were carried out in both localities of the two regions. Key informants were selected among the officials of the village administration, health officials, factory managers and workers, older inhabitants and immigrants. The interviews relied loosely on a set of guidelines and open-ended questions, prepared in advance.

Informal discussions and unstructured interviews with key informants were used to gather information on perceptions of past practices and situations, of timing and causes of changes, and of their relations to industrialization processes. Direct observation and informal interviewing proved to be eminently suitable methods to gather information about sensitive matters, such as the more controversial aspects of the industrialization process. Officials and private citizens often used such discussions to vent their grievances at what they perceived as extremely negative consequences of the presence of the factories in the village.

The findings derived from observation and unstructured interviews were collected in two preliminary reports, one concerning the Bandung and the other the Solo locations. Portions of Chapters 3 and 4 of the report rely heavily on these earlier reports.

(3) Sample survey
A sample survey was carried out to provide more systematic information on the demographic and economic characteristics of the households and their members in the chosen sites, as well as quantitative data on current and past patterns of access and use of water, fuel and animal fodder.

The sampling frame was different for the two locations. In Bandung the help of local officials in each village was enlisted to make a basic census. This included all households which:

1) had one or more members working in one of the factories,
2) had been residing in the village for more than 10 years.

From this total census population of 400 households (195 in Cintamulya and 205 in Cisempur) a 20 per cent random sample was drawn proportionally for each Neighbourhood Association, resulting in a total of 79 households, after rounding of the figures.

In Solo no random sample was used, but 15 households in each village were selected according to three criteria:

- residence in the village for at least 7 to 10 years
- a household with a factory worker among its members or else renting accommodation to workers, or both
- previous contacts with the interviewers.

The questionnaire (see Appendix B) used for the survey contained pre-coded, mostly closed questions and a smaller number of open, quantitative ones. It was divided in two parts, the first dealing with questions concerning the characteristics of individual household members and the second with those addressed to the household and its past and present use of natural resources. In both locations respondents were in the great majority the recognized 'housewife', on rare occasions an adult daughter or, even more rarely, the husband. However, when husband or other relatives were present they would often contribute their own efforts at recollection. Interviews took place in relative privacy in the home of the respondent, and lasted approximately 1 to 1.5 hours.

In Bandung 12 people from AKATIGA and two Anthropology students from a nearby university took part in the survey exercise. This was to minimize the time spent in the work and to offer the opportunity to acquire experience in interviewing techniques to as many researchers as possible. The work was preceded by a training workshop and by a pre-test of the questionnaire on six households. In Solo two researchers carried out the survey, one in each village.

No noticeable difficulties were experienced in obtaining permission to carry out the interviews, though in some cases respondents expected remuneration, or expressed the hope that the project would provide help with the solutions for what were perceived to be the two most severe problems: high unemployment and scarcity of water.

After the schedules were checked for inconsistencies and several additional visits to the field made place for clarifications, the data collected through this method were processed by entering them at first into a data Base (Excel), and then transferring them onto the more sophisticated SPSS.

(4) Focus group discussions

Information was also collected through the use of focus group discussions (FGDs). In Bandung there were two such discussions, each with about 10 participants, one of both men and women and the second of women only. In Solo there was one such meeting, with 20 participants, male and female, of different ages and social status.

These discussions had the aim of filling gaps in information after a first analysis of the survey results. They were also intended to provide additional information in a time-saving way and to explore contentious issues in a context where disagreements could emerge in the forum of an open discussion. The discussions were also seen as a means to offer local people a forum to air their views on matters of public interest. The preoccupation of local people with matters such as water, employment and 'moral pollution' (their term) was obvious from the enthusiasm of the participants in voicing not only their grievances but also their hopes for a more harmonious coexistence with the factories.

In preparation of the focus group discussions, all researchers underwent a training session on the theme. As in the case of unstructured interviews, broad, open-ended questions were prepared in advance.

(5) Case studies
The collection of case studies was intended both as a technique to collect more in-depth information on the central topics of the research, and as a format for the presentation of such material for dissemination purposes. A number of households (five in one of the Bandung villages, and 4 in each of the Solo villages) were chosen from among those which had already been included in the survey. Criteria for inclusion were informally drawn, centering on issues which the research had revealed to be of special interest from among the early findings[9].

The households chosen were visited in two additional, separate occasions, during which the respondents and other household members were invited to recount salient events in the life cycle of the household, with reference to the main topics of the research.

1.5 Dissemination of Research Findings

9 Thus in the choice of households efforts were made to include those with married female workers claiming to be unmarried (a common practice used to by-pass recruiting practices), with individuals who had been active in protests against the factories with members still engaged in agricultural activities and still raising cattle, with divorcees, and with unemployed males.

The end of the research project was marked by a one-day workshop at the Institute Technology, Bandung. The main aims of the workshop were

– to share with the local people, via their representatives, our interpretation of the information they had given us,
– to influence policy makers by providing them with evidence of the need for measures protecting the livelihood and well-being of those living in the vicinity of large factories,
– to contribute to current public and academic debates,
– to strengthen the links between different NGOs working in this field, and between these NGO and academics and policy makers.

These aims were reflected in the list of those invited to the workshop (see Appendix C), which included: inhabitants of the localities and representatives of the village administration of the research sites; officials from the sub-district and district level offices; members of environment, development and women's NGOs; and representatives of local authorities responsible for environmental matters (BAPEDAL), of the Ministry of Population and Environment (Kementerian Negara Kependudukan dan Linkgungan Hidup or KLH), and of international organizations based in the country and working on related issues. Several academics also took part, as well as a number of journalists. Unfortunately representatives from the local factories were not present.

CHAPTER 2

INDUSTRIALIZATION AND NATURAL RESOURCES IN INDONESIA

At present sustainable development is widely used as 'green' packaging by international businesses and aid donors, and as a slogan with bargaining power by Northern environmental organizations. However, its rhetoric role cannot be indefinite. In time it will, like the Emperor's new clothes, cease to cover up nakedness (Adams 1995:99)

Introduction

Since the New Order was established in 1965, Indonesia has introduced a wide range of economic reforms. These reforms, and the economic plans that go with them, are formulated in the *Rencana Pembangunan Lima Tahun* (Repelita or Five Year Development Plan). Every Repelita sets different targets, based on the achievements of the previous plan. The first Repelita designated as its main aim that of encouraging the agricultural sector, supported by the industrial production of agricultural inputs and/or the processing of agricultural produce. In this period massive efforts were put into increasing rice production, which involved both large investments on the input side (introduction of new hybrid seeds, fertilizers and pesticides) and the creation of BULOG, a governmental logistics agency for the handling of rice supplies. Gradually, the emphasis in the Repelitas has shifted from encouraging the agricultural sector to supporting the acceleration of the industrialization process (Poot et al 1990), which is now seen as the driving force for the country economic development (Republic of Indonesia 1991). Within this approach, utilization of natural resources is the key to industrialization, as is their conservation if the latter is to be part of a sustainable development (World Bank 1994). Thus the main economic policy challenge for the country, as stated in its Second Long Term Development Pan (*Pembangunan Jangka Panjang Tahap* II or PJPT II) lies in the need to continue accelerating its industrialization process while at the same time reducing the negative environmental impacts caused by it.

This challenge is complex, since the relationship between environment and industrialization has two faces: that which concerns 'inputs', in the sense that the dynamics of industrialization depend on the country's stock of natural resources, such as water, energy, and forests, and that which concerns 'outputs', since the impact of industrial activities on the immediate and future quality and quantity of natural resources is extremely wide ranging.

In this research only certain limited aspects of this relationship were taken into consideration, as explained in the previous chapter. So it is important to state that it was not the intention of the research to consider this relationship at the macro level in order to provide an analysis of the prospects for sustainable development in the country, or for global environmental conditions. These topics are amply debated in academic and other fora, in and outside Indonesia. Furthermore, it was not the intention of this research to prove whether 'sustainable development' is a useful concept or a policy approach with realistic possibilities. Rather, the research planned to study the immediate impacts of industrialization at the micro level, on the present and future quality of life of people through the effects on given natural resources (water, wood fuel and animal fodder) which they use most frequently, the latter taken both as 'inputs' and 'outputs'.

Finally, the research did not aspire to provide a blue-print for policies or interventions, for the state, the private enterprises in question or even for the many NGOs which in recent years have become involved in activities related to environmental conditions and threats. Rather, it was intended that the process through which the research was undertaken would represent a form of 'collaboration as participation', as described in the first chapter of this report. At the same time, the research included efforts for the dissemination of its findings, so as to inform and strengthen the work of those who are endeavouring to improve the living conditions and future prospects of the local population.

The present chapter provides some basic information on industrialization in Indonesia as the background to events and conditions in the research locations, as the problems which have been identified as being the most salient in such locations are related to the environmental consequences of industrialization . This section also summarizes briefly the most salient state interventions in the field. The second part of the chapter concentrates on the natural resources under investigation: water, domestic wood fuel and animal fodder. This too is intended as the background to local circumstances and changes. Consideration of each of the three resources will raise different issues, since their importance to the population differ, as do the ways in which each is accessed and exploited. An element of these differences is that of gender since, as hinted in the previous chapter, there exists a sexual (and a generational) division of labour in the tasks and responsibilities associated with the collection and utilization of these resources. In addition, this section will be used to return to some of the issues of common property management raised in the previous chapter, but with more specific reference to both the three resources and the Indonesian context.

2.1 Growth, Industrialization and the Environment

There is little doubt that Indonesia has succeeded in meeting the development targets set by PTJP I. Income per capita has risen from US$50 in 1967 to US$650 today (World Bank 1994). Poverty has decreased from 70 million people or 60 per cent of the total population in 1970, to an estimated 27 million or 15 per cent in 1994 (World Bank 1994). A considerable achievement has been the elimination of dependence on food imports, with the target of self-sufficiency in rice production having been met since 1983. Basic social indicators point to the positive effects of these changes. Life expectancy increased between 1960 and 1990 from 41 to 61 years of age; mortality rates have declined from 225 to 64, and adult illiteracy rates from 61 to 23 (World Bank 1994 Table 1.1). Daily life in most cities and villages, especially in Java, has seen considerable changes with the deeper penetration of faster and more reliable means of transportation and communication, with electrification and with the continued and expanded mobility of people.

The policies responsible for such achievements have not been uniform during this entire period, nor have the results been unambiguous. On the first score, it must be noted that in the mid-1980s the international fall in oil prices led policy makers to re-think the country's reliance on its resource base and on internal markets, with implications for certain features of the industrialization process, as well as to introduce an austerity programme (Smyth et al 1994).

On the second score, it is important to point out that many observers have been questioning the outcomes of such policies have been entirely positive or equitable. While such critics accept that poverty levels may have dropped, they also point out that a larger number of people are now living just below the poverty line, and that even those living above it are beset by forms of insecurity and vulnerability unknown before. In addition to showing that the gap between rich and poor in the country has become wider, these critics also believe that differences in the spacial distribution of development benefits have become more acute. While poverty used to be mainly a problem limited to Java, this situation has been reversed since the 1970s; by 1987 Java had less than 50 per cent of the poor, while eleven provinces outside this island had a higher proportion of the rural population living in poverty than did any of the provinces of Java (Booth 1992). Another line along which inequalities are still ranged in Indonesia is that of gender, reflected even in the most visible gains made in the country. For instance, literacy rates for women are not improving as much as those for men; one third of the economically active female population has never attended school, compared to 15 per cent of males (cited in Smyth 1993). Finally, many express concern about the fact that development strategies rely on a political climate which prevents active popular participation (Dirkse et.al. 1993) and in fact gives rise to abuses of human rights.

As mentioned earlier, industrialization has been at the core of Indonesia's development policies during the last few decades. The increased role played by industrialization is clear from its contribution to GDP. According to Hill (1994) in the middle of the 1960s agriculture accounted for 50 per cent of GDP and the industrial sector for 13 per cent, whith manufacturing only 8 per cent. However, 25 year later the situation had greatly changed and by 1990 the share of agriculture in GDP had decreased to 22 per cent while the industrial sector had increased to 40 per cent with over 20 per cent going to manufacturing. The latter has also changed in its contribution to labour absorption from 16.1 per cent of the total in the 1971-1980 decade, through a decline to 10 per cent in 1980-85, to an increase to 26.7 per cent in 1985-90 (Paauw 1992). Finally, the role of manufacturing for export has grown dramatically, from 4.5 per cent in 1971 to 33.8 per cent in 1990 (World Bank 1994).

As noted earlier, policies concerning industrialization saw important changes in direction in the mid-1980s. While before that date the structure of industry reflected the twin features of import substitution and reliance on the country's resource base, since then there has been a sustained move towards liberalization of foreign trade and investment, as well as strong encouragement of non-oil exports and revenue. Though policies have encouraged the production of intermediate goods, resource-based industries still dominate manufacturing in both output and employment. Light industries, such as textiles, garments, footwear, toys and electronics are acquiring increasing importance, especially as a consequence of the relocation of many manufacturing, labour intensive, industries from Japan, South Korea and Taiwan (Saptari 1994). In terms of export expansion, Indonesia is characterized by a strong reliance on a fairly narrow range of goods, among which textiles and garments are the most important (Hill 1989:22).

Despite the large and diversified resource base of the country, industrial production is characterized by high spacial concentration. Most industries are located in Jakarta and West, Central and East Java, in other words, in western Indonesia. In 'outer Java' (Sumatra, Kalimantan, Sulawesi and Eastern Indonesia more generally) the manufacturing sector is poorly developed. Within Java, large manufacturing industries are clustered on the outskirts of cities such as Jakarta and Bandung (Braadbaart and Wolters 1992), where they are in easy reach of services (transportation, communications and financial institutions) (Saptari 1994), but where they contribute to the generation of massive problems associated with rapid urbanization and industrialization.

The environmental implications of the development and industrialization strategies on which Indonesia has embarked cannot all be spelled out here. According to the World Bank (1994), the most urgent problems are those associated with

- water supply and sanitation,
- solid waste management and vehicle emissions in towns and
- industrial pollution and the management of forests.

The World Bank also recognizes that there are very broad implications of such problems, not only for the continuation of the present patterns and pace of growth but also for people's livelihood and health, as well as for the political stability of the country.

Though rendered more urgent and extensive by contemporary development strategies, environmental problems are not new to Indonesia, nor is a public official concern for them. The Dutch colonial administration recognized the importance of conserving and protecting natural resources, and put into place regulations and institutions to that effect (Cribb 1988). Most regulations were of a sectoral nature; for example, those which tried to encourage peasants to produce fuel wood to ensure that its use for both domestic and productive activities would not lead to deforestation (Donner 1987:161). In present times, environmental issues attract the greatest attention from academic and media sources. Their importance spills over into the political arena, where they have an extremely high profile. In the words of Carol Warren (1994:1)

> *In Indonesia, environmental issues have become deeply entangled with underlying political positions supporting and contesting official constructions of the nation state - and the relationship between local, metropolitan and transnational interests within it.*

Independent Indonesia has long had a preoccupation with environmental protection regulations. The legal foundation of all regulations is the Management of the Living Environment Act of 1982. The legislation includes various systems of incentives and disincentives, for example in the field of taxation and import duties, as well as a system of licencing (Hardjasoemantri 1989).

As part of this legislation, the need to prepare an AMDAL, which is a wide ranging environmental impact assessment requirement which applies to every investment project in all sectors of the economy. The regulations which detail AMDAL are known as PIL, *Penyajian Informasi Lingkungan* (Preliminary Environmental Report), ANDAL, *Analisis Dampak Lingkungan* (Environmental Impact Statement) and RKL, *Rencana Pengelolaan Lingkungan* (Environmental Management Plan).

The government has also put into place relevant institutions for the management and implementation of such regulations, beginning with the Environmental Impact Management Agency (*Badan Pengendalian Dampak Lingkungan* or BAPPEDAL) in existence since 1990, and a Ministry the for Environment, which has been in existence since 1978 but was restructured and renamed in 1992. In addition, the establishment of the Bureau of Natural Resources and Environment within BAPPENAS (The National Development Planning Board) is said to signify the penetration of environmental concerns into the very heart of the national development planning institutions (Santoso 1994).

Despite the long history and comprehensiveness of environmental regulations and of their institutional framework, it is generally agreed that their effectiveness is extremely limited, because of the patchy and problematic nature of implementation. According to one commentator, 'implementation of existing regulations is currently the most important issue at stake' (IWACO 1992:85). Lack of political will at all levels, from the national to the local and extreme fragmentation of environmental responsibilities among the various institutions responsible are said to be the root causes of the poor implementation of the existing laws (Ibid). Another major problem associated with implementation of existing legislation lies in the profound contradictions and conflicts between the formal legal system developed by the legislation, which mostly relies on western legal norms and concepts, and indigenous understandings and management systems (DEMOS 1993). Another problem is the kind of corruption by which, for example, local bureaucrats apply pressure on land owners unwilling to sell their land to middlemen working on behalf of investors in areas designated for industrial, residential or recreational developments. These problems are compounded by the lack of genuine public participation (Warren 1994) which permits, among other things, this collusion between local and central authorities on the one hand and industrial and business interests on the other. This situation has resulted, in recent years, in a highly charged political atmosphere which has at times erupted in disputes of various types, and in often turbulent protests by farmers, factory workers, indigenous peoples and students (Eco-Sounder 1994) .

2.2 Water, Fuel Wood and Fodder

In this section information is given on the availability and uses of natural resources in Java, and where appropriate in Indonesia more broadly. It should be pointed out that while the literature on macro issues is large and growing, not as much appears to be available about practices for the management of such resources at the micro level, including relations between households and within them.

Water
In Indonesia water is required for irrigated rice and non-rice crops for aquaculture in fresh and brackish water ponds, rivers and lake for municipal water supplies for drinking purposes, for urban, industrial and commercial uses, for hydropower generation and for inland navigation and recreation (World Bank 1990:82). In the rural communities of Java, water is used for drinking, cooking, bathing and the washing of clothes and dishes (Thorbecke and van der Pluijm 1993). Since Indonesia is a country in which the majority of the population is Muslim, water has particular significance for its purifying role in rituals stipulating specific bathing procedures that precede prayers five times a day. Water is thus essential for the development of the country and for the health and the personal and social well-being of all its inhabitants.

Unfortunately, despite the high rainfall, total water resources available per capita in Java are rather low, especially when compared to other regions or countries. According to the World Bank (1990) in China, which has far less rainfall and a much larger population, water availability is much more plentiful than in Java. Furthermore, water, like so many other types of resources, natural or otherwise, is unequally distributed: 44 per cent of the total resources are in West Java, 30 per cent in Central Java and 26 per cent in East Java.

The INPRES programme for hygiene and sanitation is the basic instrument through which the government is attempting to provide safe water and sanitation for the population. About 80 per cent of all public funds for rural water supplies and sanitation are channelled through this programme. Since Repelita I resources allocated for water and sanitation have shown a dramatic increase, but budgetary allocations for these purposes are still negligible, when compared to those of other Asian countries (Johnston 1986).

Thus access to clean water for domestic use is very limited. According to a 1980 UN worldwide report, Indonesia ranked 11th in rural water supply coverage and 13th in urban coverage (World Bank 1990:110). Water of this type is obtained most frequently from dug wells, wells with hand pumps, gravity-piped systems, artesian wells, rain and spring collection tanks. In 1980 only 12 per cent of the households in Java had access to piped or pumped water; of these 41 per cent were in urban areas and 4 per cent in rural areas. It has been estimated that in 1986 only about 40 per cent of people in urban and rural areas taken together had access to safe water supplies. This compares very unfavourably with standards in other countries, such as India, where the WHO has estimated that 75 per cent of urban residents and 31 per cent of rural residents have access to safe water (World Bank 1990).

Furthermore, availability of water for domestic use has a seasonal character. A study carried out in Sumatra (Johnson 1986) showed that during the rainy season wells could satisfy about 80 per cent local demand but that this situation was profoundly altered after only three weeks without rain, with a dramatic decline in the quantity and quality of water available. The author comments that rain water is not collected by people in any useful quantity because of the high cost of storage tanks. This information is confirmed by Hardjono (1991). She presents a case study of a settlement in West Java where people use rain water for both drinking and cooking. However, only the wealthier families could have afforded to build the tanks necessary for water storage. For the others, the solution was to use water from lakes and ponds, which often entailed work of several hours, depending on the distance of these sources of water.

Water pollution adds to the problem of structural scarcity. Pollution can have many causes and many consequences. Guinness (1986) in discussing the settlement of Ledok near the city of Yogyakarta, notes that the increased use of pesticides and fertilizers prevents people from using the river for bathing and washing clothes and dishes. On the other hand, toilets are few in the village, forcing people to use the river for this purpose and thus compounding the effects of agricultural pollution. Village children, however, still play stet river, with negative consequence for their health.

It is also well known that factories are causing considerable pollution, to rivers, such as Cisadane in the Tangerang region of West Java (Donner 1987:267). The type and seriousness of this kind of pollution clearly depend on the activity in which any given factory is engaged. It can affect the quality of surface water through effluents, but also it can affect ground water through spillages and leaking. Quantity of water can also be affected by the activities of enterprises, since the great majority of industrial concerns in Java satisfy their water needs through deep-well extraction.

The Clean River Program (*Prokasih*) has been introduced to limit the damage of industrial pollution to rivers. However, weak sanctions for offenders and generally poor enforcement make it an ineffectual tool for the protection of river water (IWACO 1992;67). Licences and fees are the instruments used to control the depletion of ground water via the drilling of deep wells by factories. Again, poor monitoring makes both registration and fee collection extremely uneven (IWACO 1992:65) and thus an ineffectual tool to control this form of water exploitation.

In rural areas large quantities of water are used for agricultural purposes. The way in which irrigation is organized has relevance also for the domestic use of water. There may be competition between the two, since attempts to provide better domestic supplies may be hampered by the needs of irrigation networks dependent on the same spring (Hardjono 1991).

There may also be complementarity, since irrigation canals are frequently used for domestic purposes (Schrevel 1993).

Water for irrigation in Indonesia is sometimes allocated according to community based systems of long standing; examples of these can be found in various parts of Sumatra and in Bali. Much more often irrigation depends on bureaucratic-communal systems, where the responsibility for water allocation is shared between an official agency and water users associations. Such systems, though partly community based, remain hierarchical; the hierarchy depends to a large degree on land ownership among the members of the water users association (Schrivel, 1993). The importance of land ownership and distribution is a key factor in considering the access of local people to all the natural resources under consideration.

A separate aspect of this is that, despite the fact that women in Indonesia are directly and intensely engaged in agricultural work, their contributions to irrigation management is often ignored. According to Oomen-Myin (1986:11), '...the mere mention of issues concerning the position of female farmers in irrigation projects is viewed as bizarre, or quite irrelevant, by most development specialists'.

As far as domestic use of water is concerned, collecting and carrying water for domestic use is often, but not exclusively, the responsibility of women, usually adult women with the help of their daughters or other young female relatives. This is extremely time-consuming and tiring work from which there cannot be respite, since water is indispensable to the smooth running of any household, and its quantity and quality have a serious and immediate impact on the health and well-being of its members. A study by Aripurnami (n.d.) shows that women in Sumatra may have to walk more than 5 km each day to fetch water and to bathe.

Fodder

The use of fodder is obviously related to livestock, hence it is necessary to make a brief mention of the livestock production capacity in the country. Thornecke and van der Pluijm (1992) argue that Indonesia has a relatively small livestock sector, the ratio of livestock to people being the lowest in South Eat Asia. Most milk-producing businesses are said to operate on a very small scale. In Java the total number of 5.17 million cattle is distributed among 2.75 million cattle-keeping households, an average of less than 2 animals per household. However, the dairy industry has seen expansion since a government credit programme was introduced in the 1970. According to Hardjono (1991) there are some constraints in the supply of fodder, because of recent increases in the numbers of dairy and other cattle in Java. Many farmers who are engaged in cattle rearing try to compensate by planting elephant grass and by importing truck loads of maize stalks and leaves from the lowlands during the dry season. Sugar cane leaves are also used as fodder for intensive stall-feeding of dairy cows and beef cattle (Prabowo and McConnell 1993).

Large ruminants, such as water buffaloes, are used in greater numbers for draught power, since mechanization in agricultural production remains limited. Smaller animals are kept in most parts of Java, not only by those owning larger plots but also by people with little or no land. Keeping small animals is also very common in some of the islands east of Java, such as Flores, Sumba and Timor, where dry forest and pastures are used for grazing cattle (Donner 1987 :25). Horses are kept as a means of transport for both people and goods in many parts of rural Java, but it is difficult to find information on how they are fed and reared. Poultry is much more common than other livestock in Java, but while there is a growing commercial poultry sector, especially since the introduction of *ayam ras* (high-yielding chickens) in the 1960s, here we are interested in the practice of keeping just a few chickens and ducks for home use or small-scale trade of either poultry or eggs.

Most farm animals, especially sheep, goats and cows are fed partly by letting them graze in fields just harvested, and partly with fodder which is cut and carried from fields, waste-lands and road-sides, and from the ground under plantation trees and forests. The fodder consists of weeds, shrubs, herbs, woody plants and grasses of different nutritional richness. What is important in any consideration of these practices is that, although they cannot be given a cash value, they represent 'a significant investment of human labour and knowledge of the relation between the material gathered and its likely return in animal production' (Lowry et al 1992:4).

There is a rather flexible division of labour in the work associated with looking after and feeding domestic animals. Some gender-based rules apply nonetheless, as well as generational ones. Large animals, such as cattle and buffalo, are minded by men and boys. In Java, small boys leading and bathing water buffaloes is a common sight. Fodder is also collected mostly by males. Smaller animals, on the other hand, are tended by women (Bernninghausen and Kerstan 1992). This is particularly the case for chickens, which women keep in coops or allow to run free on their *pekarangan* for family consumption, for exchanges and for other uses related to religious and community rituals, and for sale. It is interesting to note that the labour of one's own children is often used in poultry raising at a larger scale. Child labour is extensively used for the care of goats too (Peluso 1992). Older members of the household are also identified as being responsible for this type of work. Finally, research has shown that this is time-consuming work, since it has to be carried out daily (Palte 1989) to ensure that the fodder is fresh and hence edible.

In terms of relations between households, an interesting observation made by Hardjono (1991) is that in Java there is a good deal of cattle sharing. For example, a common practice which often involves farmers from lowland areas is that of *gaduhan*, in which the person who tends the animals on a daily basis shares the offspring with the owner. While this is a semi-formal system, more informal sharing practices are also reported. Households with very few resources can rely on traditional practices of a similar kind for sharing land, cattle, labour, manure etc.

As mentioned above, the question of how small and large domestic animals are reared and fed has attracted relatively limited attention in the literature. Since fodder is often obtained from the same sources which provide fuel wood, the discussion of the latter will add further information on the former.

Fuel wood

Fuels for domestic use consist of kerosene, charcoal, gas, electricity and wood. In Indonesia the majority of rural people, for a variety of reasons, still use wood as domestic fuel; urban inhabitants too prefer wood for some of their domestic needs. In the mid-1980s 85 per cent of the rural people in Java relied on wood for cooking (Pape 1988). The continued importance of wood to rural communities is linked to the costs associated with other sources of energy, and especially to the price of kerosene.

The use of wood is also related to the integrated nature of rural activities, where agriculture, home industries and reproductive activities may generate and make use of wood in an interconnected way. Water and fodder are obviously part of this integrated system. At the centre of the system is land; therefore access to and the use and ownership of land must always be kept in mind when considering the issues at hand. Java, in these terms, is characterized by very small land holdings, the average size in 1983 being 0.56 hectare, with landlessness on the increase (Sajogyo 1993).

Wood is usually collected by the users themselves, who may also sell it locally or, more often, to urban centres, mostly through intermediaries. Prices of wood are difficult to calculate, since bundles are not of standardized sizes and consist of mixtures of woods of different qualities; furthermore, buyer and supplier usually engage in bargaining (Indonesian Rural Women's Work and Energy Team 1984). According to Hardjono (1991) infrastructural changes such as the construction of road networks may encourage trade in wood, bundled by farmers and bulked by traders, from rural to urban areas. The direction of this trade is often to lowland wood-scarce areas where demand is large and where the number of purchasers may have increased in the last few years because of the abolition of price subsidies on kerosene. Lack of employment opportunities too may encourage rural people to seek earnings through the collection and sale of fuel wood.

Fuel wood is becoming severely depleted in Indonesia, as in many South East Asian countries (Burnett 1992), and as a consequence demand exceeds supply (Hadikusumah 1992). Because of the scarcity of fuel wood, various initiatives have been taken to either stimulate supply or alter demand for this commodity. Several projects supported by the government in conjunction with international organizations have sought to involve farmers in forestry conservation programmes (Subrata and Mas'ud 1990; Hadipurnomo 1990; Hidayat 1990) for this purpose. National NGOs have also been involved in the implementation of similar programmes. One example is the *System Tiga Strata*, or Three-Layers System, promoted by Yayasan Daya Pertiwi (Thamrin et.al. 1991), through which farmers grow grass for livestock, food crops, and wood crops in an integrated system. Conservation of the resource is also encouraged through support for the adoption of more appropriate technologies for cooking (Bekkering 1987).

Over and above these interventions, it is important to mention the regulation of the most important source of fuel wood, namely, forest land. Indonesia has over 100 million hectares of forest land, rich in biodiversity and supporting much human life. Tragically, Indonesia suffers from the world's largest deforestation rates, caused by land conversion, shifting cultivation and logging. The latter is identified as the major cause of the process of deforestation, through the activities of the logging companies which are granted concessions for the exploitation of forests (WALHI 1992).

Over 75 per cent of forest land in Indonesia falls within the boundaries of the State Forest Corporation (*Perum Perhutani*), and is divided in five categories (World Bank 1990):

- forest set aside for conservational and national parks (13 per cent)
- forest intended mainly for watershed protection (21 per cent)
- limited production forest (21 per cent)
- regular production forest in which selective felling is allowed (24 per cent) and
- conversion forest, which can be converted to agricultural or other uses (21 per cent).

The Indonesian State Forest Corporation manages approximately 2.9 million hectares of forest land on Java. Of this, 30 per cent is degraded or only marginally productive. The lands managed by the State Forest Corporation are dispersed throughout the island and, given the size of the population and the density of settlements, these are in the majority of cases contiguous with villages. In fact, 21 million people, in over 6000 villages, live in or near state forest land. This proximity often leads to conflicts between the forest management and farm families (Peluso 1992). Poffenberger (1990)[10] gives an example of this type of conflict in Sukatani, a village situated at the border of a newly established national park in the Puncak area of West Java. Inhabitants of the village customarily collected wood and other forest products from the land within the park. Since the opening of the park, conflicts have arisen among the park managers and the local people because the latter continue to use of the forest as a source of certain resources. A social forestry programme was initiated when problems became so serious that foresters began to carry guns.

Another example, from the same source, concerns a village in West Java which lies on the border of a state-owned forest. Many farmers in the village are landless or have extremely small holdings and have traditionally relied on the forest to make up shortfalls in agricultural production. In order to control this unofficial use of the forest, a social forestry programme was implemented through which a group of farmers helped to plant teak and mahogany on the government land, in exchange for the right to interplant food crops between the trees.

Wood is not the only material used for cooking and other domestic needs. Coconut husks and discarded timber, for example, are obtained from waste land, cropped fields, and *pekarangan* (home yards). The latter is an important generator of many resources for the family, from vegetable proteins to medicinal ingredients and fire wood. Farmers react to scarcity of wood sources in other ways too. Again according to Nibbering in Hardjono (1991), some farmers have developed an interest in planting trees to secure a supply of firewood, fodder, timber and cash. For this purpose they have started planting a number of trees on their own land. They prefer fast-growing species with seed material which can then germinate

10 From which much of the information in this section is drawn.

easily: teak and mahogany and acacia for timber and firewood and *wesen* (*cassia timorensis*), *turi* (*sesbania grandiflora*) for firewood and fodder are the most commonly grown species.

An interesting point emerges from research done in Kenya (Sunny 1986), which argues that the planting of trees may be stimulated or hampered by situations internal to households, such as their size and composition. According to this view, small holdings managed very young or very old women face labour constraints and thus have an interest in concentrating sources of fodder and fuel on or around the farm. In Java, this may influence not only the activities that smallholders undertake spontaneously to satisfy their needs for wood and similar fuel products, but also their willingness and capacity to join social forestry programmes. Another crucial element which influences the types and mixes of fuel used for domestic purposes is the economic position of the household, with wealthier ones using less biomass fuel but, interestingly, using it less efficiently than poorer households (Indonesian Rural Women's Work and Energy Project Team 1984).

In Java, the work associated with the collection of wood and other similar fuel material is shared by most household members. Women often collect bundles of wood as well as fodder for animals when engaged in other work as for example, when coming back from the fields or from taking food to their husbands at work (Smyth 1986; Peluso 1992). Furthermore, women tend to be more active in the collection of wood and other fuel from areas closer to their home and village, while men may venture further afield. Though the fact is greatly ignored by the literature, the casual observer cannot fail to notice that it is often older women who are seen carrying heavy bundles of wood, demonstrating both the presence of a fairly specific division of household work in terms of age, and the continued contribution women make to the household, even when older. Even when helped by male household members, women retain the main responsibility for the fuel available to and needed by the household, as a consequence of their reproductive duties, many of which require fuel (cooking, processing food for sale, boiling water for drinking, or bathing very small children). Dankelman and Davidson (1993) have pointed to the fact that this connection leads to women bearing most of the burden for fuel wood crisis. Whether this is a correct assumption in the context of Java or whether households devise new patterns of responsibility is one of the central questions of this research.

CHAPTER 3

IMPACT OF INDUSTRIALIZATION IN THE WEST JAVA LOCATIONS

3.1 Introduction

The present chapter provides background information on the socio-economic characteristics of the locations chosen for the research in West Java, and of their inhabitants[11]. It also describes the major changes which industrialization has brought to them. The first part contains descriptions of the five factories nearest to the locations. The second and third parts describe the two villages, Cintamulya and Cisempur. The fourth part begins to look at changes within households, as a step towards addressing the main research questions.

Most modern manufacturing is located on the island of Java, within which West Java has attracted the biggest share of large and medium scale Factories (Hill and Weidemann 1991:22). Differences internal to the province are also evident: foreign investment has mostly been directed to Jakarta and the Botabek (Bogor, Tangerang and Bekasi) region, while domestic olly owned Factories are in the main concentrated around the towns of Bandung, Cirebon and Majalengka (Sayogyo and Wahyuni 1994). Typical of West Java also is the concentration within its borders of textile production, especially

11 The information for this section relies in part on written records available from the village and district offices, and in part on data collected by various members of the research team, using methodologies described in Chapter 1.

for export (Hill 1989). This province has been a centre of textile production since the early decades of this century. Thus the existence of a fairly skilled labour force is one of the reasons which has attracted further investments in textiles in recent times (Hardjono,1989). All the Factories surrounding the research locations produce either textiles or yarn.

The locations we are concerned with are situated to the east suburbs of Bandung, about 25 km from the centre of the city. Administratively they belong to the district of Sumedang (see Map 1). The two locations are respectively next to and at some distance from the Bandung-Garut road, which leads on to the south-eastern regions of the island. They belong to the sub-district of Cikeruh, and constituted one administrative entity until 1983 when, because of expansion, they were divided into *desa* (village) Cintamulya and *desa* Cisempur (see Map 2).

Local legends reveal interesting associations of these places with nature. In the case of the first, it is said that the hamlet of Citanggulun, the largest in Cintamulya, was established during early colonial times by one of the descendants of the ruler of Sumedang. He named the settlement after a nearby spring *Sirah* Tanggulun. Cisempur, on the other hand, may have been named after the Sempur tree of which, according to one version of the origin of the village name, an extremely large specimen used to dominate the local landscape. An alternative version attributes the name to the presence of the spring *Sirah Cai*, which flows at the foot hills of Mount Geulis (on the slopes of which the village is built) and which, it is said, made the area '*ngempur*', or 'radiant' (in the Sundanese language). Furthermore, the peak of Mount Geulis is believed to be sacred, being the burial place of Tandurgagang, a mythical female being associated with agricultural rites. To this day, farmers refrain from pronouncing the word '*tandu*r' (to plant) at the time of planting rice. It should be mentioned here that the great majority of the inhabitants of the two locations are ethnic

Sundanese, speak both Sundanese and Bahasa Indonesia, and are Muslim.

A central element of this research has been the different degrees to which the industrialization process has affected the two locations under study. On one hand there is Cintamulya, which lies on the main road and at very close proximity to the factories. On the other there is Cisempur, which lies about 3 km back from the road and has, so far, felt the impact of this process less directly but is being increasingly drawn within its orbit.

Map 1
Sumedang District

Map 2
Desa Cintamulya and *Desa* Cisempur

Along the same road are ranged the five factories which are of immediate interest to this research. They are located in an area where the expansion of industrial production has been intense. With the passing of the Governor's Decree (*Keputusan Gubernur*) n 593 of 16t May 1990, an area of 400 ha in the district of Sumedang was decreed to be an industrial zone. The vicinity to the city of Bandung and the facilities it offers has made this a particularly attractive region for new factories. Furthermore, the administrative district of Sumedang is considered to be a better alternative to territory lying within the Bandung district administration, since it has so far been less involved in the expansion of industrial production.

3.2 The Factories

The oldest of the the textiles factories in the area is PT Five Star, established in 1975. PT Five Star is a foreign investment (*Penanaman Modal Asing* or PMA), with capital of Indian origin. The other enterprises were built later. PT Kahatex and PT Banon in 1986, PT Supratex in 1988, and PT Insan Sandang in 1990. The four newer companies are all owned by Indonesian entrepreneurs of Chinese descent. Give the fact that Five Star, the oldest of the five Factories, has been at its present site for over 20 years, it is clear that our locations were affected by the process of industrialization well before the Governor's Decree had been passed, though in a much less profound way than since the mid-to-late 1980s.

The factories produce primarily cloth and yarn, 60 per cent of which is destined for national markets and the rest for export. The direction of export from PT Five Star is mainly to Australia and Saudi Arabia, from PT Kahatex Taiwan, Hong Kong, Saudi Arabia, Germany and the Netherlands, and from PT Insan

Sandang to the Middle East, the USA and several European countries.

All but one of the factories are large, in terms of the classification adopted by the Central Bureau of Statistics[12], as can be seen from Table 3.1 below:

Table 3. 1 Size of Local Factories by Number of Workers

Factory Name	Labour		
	Female	Male	Total
PT Five Star	706	474	1080
PT Kahatex	6572	1755	8327
PT Supratex	102	176	278
PT Banon	13	48	61
PT Insan Sandang	130	674	804

Sources: *Laporan Tahunan* 1994, Dinas Perindustrian, and Interviews

The size of the factories can be juged also from the amount of land which they occupy. Five Star is situated on just over 10 ha of land, PT Kahatex on 35 ha and PT Supratex on 5 ha, as is PT Insan Sandang. This land was previously irrigated rice land (*sawah*), owned in part by local farmers living in Cintamulya but in large part by urban-based landowners from outside the area. According to the man who was head of village of Cintamulya between 1984 and 1993, during the negotiations which preceded the establishment of the most recent factories, such outsiders were enthusiastically in favour of selling their land. Local farmers felt compelled to sell their own plots by the fact that the latter were eventually marooned in the middle of

12 The definition 'large' is applied to enterprises employing 100 or more workers. This has become largely meaningless in view of the expansion of factories employing several thousand workers.

vast expanses of industrial land. The survey carried out in the research sites revealed that 25 per cent of the sample population has sold land, and that 50 per cent of this have done so within the last five years, in other words during the fastest period of industrial expansion. In the great majority of cases (75 per cent) plots sold were under 0.25 ha, and the rest were under 1 ha.

The most notable impact caused by the factories on the natural environment of the area, therefore, is the transformation of land from agricultural to industrial use. According to statistics kept by the Cintamulya village office, in 1986 the land area (within the village boundaries) occupied by irrigated rice fields was still 87.6 ha, and land for industrial use was only 10 ha. By 1995 the area occupied by rice fields had declined to 20.75 ha and that given over to factories had risen to 55.2 ha (or 42.3 per cent of total village land). The process is continuing, for while the research was taking place PT Insan Sandang was in the process of expanding on another 2 ha, and PT Supratex on another 200 ha, partly within Cikeruh sub-district and partly in the adjoining one. Already 60 ha of land belonging the more distant village of Cisempur had been earmarked for industrial use. On the land already sold for industrial expansion but where building has not begun, farmers are still able to grow crops, under rental arrangements by which they pay the new owners (the industrial developers) in rice at the rate of kg 1.5 to 2 kg per *tumbak* or 14 square metres. Prices of land are said to have continued to increase from between Rp22,500 and Rp55,500 per *tumbak* to between Rp100.000 and Rp500.000 since the mid 1980s. However, local farmers find it difficult to obtain what they believe to be the best price for the land. This is because there are many unscrupulous speculators who attempt to acquire land from them as cheaply as possible.

In the preceding chapter, a comment was made about the integrated nature of agrarian systems, and about the central role that land plays. As a consequence, it is to be expected that such a dramatic change in land use will have repercussions both on the availability of other natural resources (water, fodder and wood for fuel) and on the socio-economic life of the community.

Textile and yarn production takes place in several phases, and factories may engage in either some or all of them. Raw materials are successively spun, woven, dyed and then finished before the product emerges. Certain stages of the work, in particular for dyeing and finishing, require abundant water. All the factories derive their water from deep artesian wells, as is the norm (see Chapter 2). According to local informants, PT Kahatex has 15 such wells, while the numbers put dowmn by the other factories are unknown. Thus the second obvious impact of widespread industrialization in the area is substantial competition for the existing water resources available to the community. Given the extreme proximity of the factories to Cintamulya, the impact is particular acute inthis village, as will be discussed below.

A by-product of the dyeing and finishing processes is industrial waste water. PT Five Star, PT Kahatex and PT Insan Sandang - the largest of the five factories - all produce waste water. They pre-treat it through their own treatment facilities (*Instalasi Pengolahan Air Limbah* or IPAL) using chemical, physical and biological agents. Once treated, the waste water is discharged into a tributary of the Cikijing River via small canals. One of the factory workers interviewed for the research expressed doubt that the treatment facilities are always used, suggesting that they are put to work only when a government inspector is due to visit the plant. Waste waters flowing from the factories into open ditches are visibly polluted, and many of the local inhabitants of Cintamulya commented on the unpleasant smells that they generate.

The production of yarn and cloth takes place on a 24-hour basis. Thus another by-product of the textile factories is the continuous noise, which causes considerable disturbance to the community, especially to those inhabitants who now find themselves very close to the factory buildings. Therefore, water, air and noise pollution represents the third type of environmental impact caused by the factories.

It is necessary to move now from the physical impacts of the factories to the characteristics of the employment they generate. Many of the members of the two communities under observation find employment in factories, both those nearby and others further away. The census carried out for sampling purposes revealed that in Cintamulya nearly 10 per cent of the total population or 12.3 per cent of the total labour force is employed in factories. Of the total number engaged in industrial work a majority (61 per cent) are employed in the factories within the research location and the rest outside. In Cisempur we found 13.9 per cent of the total population and 24.5 per cent of the labour force in industrial work; of these, 53 per cent worked locally, and the rest further afield. While it is clear that the higher proportion of industrial workers from Cintamulya employed locally is due to proximity to the factories, it is interesting to note that industrial employment is more significant for the people of Cisempur.

Our survey data also confirmed that both local and more remote factories offer many employment opportunities to the inhabitants of the two villages: 62 per cent of those in paid work gave factory work as their main form of employment. The local factories gave employment to 33 per cent of these workers, while 38 per cent were working in Factories in the same district, and the rest beyond that. Two more of the findings of the survey which concern employment deserve mention. One is that on aggregate (no distinction between the two villages) 92 per cent of those interviewed stated that they do not have a secondary occupation. 'Occupational multiplicity' has always been important in the rural regions of Java, as a strategy to ensure regular and sufficient income and hence a degree of security. This information would point to the fact that it is becoming less of a choice, possibly because of the constraints imposed by rigid working hours and shift work in the factories, and by the disappearance of cultivable land. Factory employment is also characterized by long hours of work; for example, of the respondents from one of the villages (Cintamulya) who work in factories, nearly 40 per cent stated that they work between 6 and 10 hours a day.

The second finding concerning employment is that six out of every ten factory workers in our sample are women. The preference given to female workers by the largest enterprises is clear from Table 1, and is confirmed by local informants. The correlation between numbers of female workers and the size of the enterprise is explained by the fact that female workers are mostly employed in certain tasks (such as spinning and packing), which are carried out only in the larger and more diversified factories. This preference is confirmed by our survey, which showed that female workers out-number males for all age groups. Interestingly, the difference was greater in the older age groups (31 to 50), where one would perhaps expect the contrary, given the responsibility women maintain for housework and children. It is often repeated both by the relevant literature and by local respondents that employers prefer younger, unmarried women. However, of the female workers in our survey, the largest number was in the 21 to 30 age group. To satisfy themselves that prospective workers are single, employers require that among the documentation they submit a letter of confirmation of civil status (*Surat Keterangan Belum Menikah*). Village administrators feel very strongly that there should be employment opportunities for local people, thus occasionally officials responsible for marriage registrations (*Pegawai Pembantu Pencatat Nikah* or

P3N) are prepared to provide information to that effect to those responsible for issuing such a letter (*Kantor Kecamatan* Cikeruh), even when the woman in question is actually married. Both workers and factory managers interviewed thought that employers have tightened their formalities since they have become aware of this deception. A woman worker (a 20-year-old girl from Lampung, Sumatra) stated that applicants who claim to be single may be subjected to a physical examination by a doctor!

The importance of factory work for the women themselves is highlighted by the fact that the income it provides is higher than that from most of the other occupations (such as teaching) to which they have gained access. For men, on the other hand, earnings from alternative employment (such as agriculture, vehicle driving, and casual work) are comparable to those from factory employment.

Despite what has been said so far, the five factories employ mainly migrant workers. These are mostly from West Java, from the district of Sumedang and from the regions around Cirebon, Indramayu, Majalengka and Tasikmalaya. In addition, a smaller number are from as far away as Sumatra and Kalimantan. Various informants agree that employers are reluctant to hire local workers, especially those from Cintamulya, whom they consider to be less industrious than migrants and to be unruly, badly behaved and often drunk. According to a member of the personnel department of one of the factories: 'Too much has been made of complaints about employment opportunities by a small handful of dissatisfied persons. The people concerned were not accepted for employment because of their bad behaviour, their habit of getting drunk and their defiance of supervisors.'

From the point of view of the community, blame for this situation is frequently allocated to some of the village leaders who, people believe, have been unable or unwilling to negotiate agreements which would ensure that a fixed percentage of jobs is reserved for local people. In other cases, it was claimed that such agreements had been made informally but not binding enough to be respected by the employers. In the context of this research, representatives of the community expressed considerable anger at the fact that the factories do not provide what they consider adequate employment opportunities for the local population, and especially for men. That resentment was strong among the population at large was also evident from our discussions**.** On several occasions the village of Cintamulya had witnessed protests by young men. In one instance in 1989, PT Supratex had been physically attacked by a number of local men, and suffered damage to the walls and to some machinery. According to a migrant worker resident in the village, the event necessitated the intervention of KORAMIL (Sub-district military command). This proved to be quite counterproductive, since the disturbance meant that those involved were then unable to obtain the 'letter of good conduct' which is indispensable in applying for a formal job. A man working as a security guard at PT Insan Sandang confirmed that the reputation of the local men, possibly acquired from such protests, makes them unattractive as workers.

Whether male or female, local or migrant, workers are recruited either through contacts they have within the factory or through an intermediary, to whom they may have to pay sums as large as Rp100,000. Once introduced, workers undergo a series of health and attitude tests before being formally employed. The education required of workers is varied; in many cases they possesss some form of secondary education, in others they may have completed only primary education. On the whole they do not possesss special expertise or skills. The exception is those who are employed to work with machines and who are therefore required to have qualifications from a secondary technical school. Those in ancillary jobs, for example cleaning, have little or no education at all and tend to be older, married women. Hours of work are usually from 8.00 to 16.00 for non-shift work and 6.00 to 14.00, or 14.00 to 22.00, or 22.00 to 6.00 for shift work. Earnings vary according to seniority and tasks, but factory based informants claimed that the Minimum Wage Rate (*Upah Minimum Rata-rata* or UMR) for West Java of Rp4600 per day at the time of the research was always paid. According to statistics kept by the village administration, this means that average wages for both male and female workers are between Rp100,000 and Rp200,000 monthly. This compares well with some but not all the earnings of other categories of workers for a similar numbers of hours of work. For example, according to interviews, an agricultural labourer would earn about Rp3,000 (female) or Rp4,000 (male) per day, while a construction worker (always male) may earn between Rp10,000 and Rp15,000 per day.

Most factories were said to provide workers with meal bonuses, uniforms twice a year, face masks (which few of those interviewed cared to wear), insurance (*Asuransi Tenaga Kerja* or ASTEK) and social security work funds (*Jaminan Sosial Tenaga Kerja* or JAMSOSTEK). Some of the firms also provide transportation for workers living some distance away. Given the proximity of our locations, this benefit does not concern the inhabitants. According to workers who were interviewed, the firms offer other types of benefits, for example, three months maternity leave and other holidays. Workers informed us that the yearly leave to which they are entitled is often replaced by a cash payment.

Others suggested that conditions of work are less than ideal and that workers are allowed little rest during their shift. For example, respondents recounted that in one of the factories the workers are not given meal breaks and have to eat secretly while still working, ‘just like a cat stealing fish’ as one put it. Such pressure can lead to accidents, especially because of lack of sleep. Minor accidents occur regularly, and are treated at the local *Puskesmas* (with the exception of those which take place in one of the factories that is equipped with its own clinic), unless serious enough to require hospitalization. Longer term problems, such as loss of hearing because of the noise of the machinery, and typhoid because of poor nutrition, were mentioned by our informants but receive no attention. The staff of the health centre also confirmed that the inhabitants of the locations, workers and non- workers alike and including children, suffer from frequent respiratory illnesses, which they attributed to the cotton dust in and around the factories. Sexual harassment of female workers was also reported as a common occurrence. Though relationships between workers are considered normal, those between foremen and young girls under their supervision are said to give the latter some status for a while, but also to lead to a bad reputation. Many such foremen are of Chinese descent, and the term of address (*engkoh*) usually reserved for Chinese men is now applied to all foremen.

All the factories offer their workers accommodation, with married quarters for managers and their families and barracks for the workers. Both are within the factory compounds. Accommodation for workers consists of large rooms shared by 20 to 25 individuals. No lockers, beds or other amenities are provided, but can be bought by the person in question. A considerable amount of control was said to be exercised over the female workers who choose to stay in the barracks, in particular, they have to report when leaving and returning to the factory compound. Despite this, the great majority of female workers seem to prefer to live in the factory, free of charge. Those who, for various reasons, choose to live out are mostly settled in the two villages of our research, in particular in Cintamulya. Here they can rent a single or a shared room (rarely more than two people will share) in specially built *kost* (hostels). Rent is from Rp15,000 to Rp30,000 per month. This guarantees access to washing and cooking facilities, as well as the possibility of buying basic goods in a *warung* (small shop) attached to the hostel. Some of these hostels are single-sex, others are mixed, and in many cases they develop an ethnic flavour, since workers seek the company of others from a similar background. In some cases they retain a vague sense of family life, while in others they are more impersonal. In both communities, however, the coexistence of such large numbers of young men and women is said to be leading to what people referred to as 'moral pollution' in the area.

3. 3 Cintamulya : A life full of honour and love?

Once Cintamulya (*cinta*=love, *mulya*=honour) was created as a separate administrative entity, its official name, chosen at a meeting of community members, reflected not so much a mythical and heroic past as the hopes for the future. Now local inhabitants refer to their village with wry humour as Cinamulya or honour of the Chinese, referring to the fact that several of the nearby textile factories are owned by Indonesians of Chinese descent. Another name by which the village is known to outsiders is Dollar City, with reference to the wealth that industry is supposed to have brought to it. This too is regarded with some skepticism by the inhabitants.

Administratively, the village is divided in two boroughs (*dusun*), seven Village Associations (*Rukun Kampung* or RK) and 21 Neighbourhood Associations (*Rukun Tetangga* or RT). The first borough covers the hamlets (*kampung*) of Cipasir, Nagrak and Citanguulun, the second the hamlets of Cibungur and Cipajaran.

3.3.1 Geographical Conditions and Infrastructures

As mentioned above, Cintamulya borders on the south with the Bandung-Garut road. Its western border links it to the village of Cimanggung. Behind the village, which is located at an altitude approximately 675m above sea level, lie the rapidly shrinking rice fields and the hillier ground on which Cisempur is located. The term 'corridor economy' (Braadbaart 1992) is very suited to the village. It reflects its physical proximity to the main road and also its reliance on activities which are either located on the road, or made possible by the means of transportation which travel along it at the halting and chaotic speed permitted by the considerable bulk of traffic. Public transportation passes along this road at all times of the day and night. All facilities unavailable within the village and important for the community are located along this road or in Bandung. The market of Dangdeur is only 4 km away and is used with great frequency by villagers, both to buy and to sell goods.

A smaller, only partly paved road, leads into the core of the village; its unpaved sections are extremely dusty in the dry season and muddy in the wet months of the year. This road is used by pedestrians, by private motorized traffic, and by the two-wheeled horse-drawn carts and the many *ojeg* (motorcycles) which local people use as means of public transportation. Much narrower, unpaved, alleys make their way between the closely massed houses.

Though the village has a fairly abundant rainfall of 700 mm per year and an average temperature that ranges between 23 and 32 degrees centigrade, its inhabitants often complain of finding the weather very hot and dry. One explanations given for this is the fact that trees are only an occasional feature of the village, the houses being built virtually leaning onto each other. The unpleasant local climate is also attributed to the fact that the zinc roofs of the nearby factories throw off a blinding glare which adds to the heat.

Since the houses are built very closely together, they are rarely surrounded by the homeyard (*pekarangan*) typical of more rural settlements. Most houses, or about 500 in number, are permanent constructions of brick, mortar and tiled roofs. There are also 250 semi-permanent houses, and 250 non-permanent constructions, such as shelters on raised platforms, built of woven bamboo. Most of the houses enjoy the benefit of electricity.

There are several public buildings in the village, from which services to the population are available. In addition to the building which houses the village administration offices, there are four primary schools (*Sekolah Dasar*) and one lower secondary school (*Sekolah Menengah Pertama*). There are also four institutions for Islamic learning (*Madrasah*) and two boarding schools for Islamic studies (*Pondok Pesantren*). Higher educational institutions are to be found in Bandung or Sumedang. For their immediate health needs, the population of Cintamulya must cover the 3 km to Cisempur, where the Community Health Centre (*Pusat Kesehatan Masyarakat* or *Puskesmas*) is located. The Centre provides services for routine check-ups and minor interventions, services for mother and child health (*Kesehatan Ibu dan Anak,* KIA), immunization, anti-natal and family planning services. Family planning is also available through the Village Family Planning Units (*Pos keluarga Berencana* or Pos KB) which are managed by the Family Welfare Education Programme (*Pendidikan Kesejahteraan Keluarga* or PKK) and are available in each RK. More extensive and specialized medical facilities are available at the Cicalengka Hospital (*Rumah Sakit* Cicalengka), at the Sumendang General Hospital, or at the many public and private institutions in Bandung.
In addition to formal institutions and their services, the village has a number of community organizations, some of which are connected to the official structure of the village. Among these are the Village Council (*Lembaga Musyawarah Desa*, LMD)

which has 15 members, the Village Resilience Organization (*Lembaga Ketahanan Masyarakat Desa*, LKMD) with 16 members, the Organization for Village Development (*Kader Pembangunan Desa*, KPD) which has 10 members, and the Family Welfare Support Organization (*Pendidikan Kesejahtera Keluarga,* PKK) with 35 members. The Neighbourhood Youth Association (*Karang Taruna*) with 214 members, is a large organization, composed of art and sports groups as well as religious study groups,.

The village is served by a credit program of the bank of the Republic of Indonesia. Within its boundaries is also located a unit of the Laboratory Work Programme *(Program Laboratorium Unit Kerja*), through which students of the Home Affairs College (*Sekolah Tinggi Pemerintahan Dalam Negeri,* STPDN) participate and train in matters related to village administration. There are several sports facilities which, though basic, are well used: one football field, three volley-ball courts, five badminton courts and seven table-tennis areas.

While the village receives some support from the Community Service Programme of the University of Padjajaran, Bandung (*Program Kuliah Kerja Nyata*, KKN), for example, for road paving work or in family planning matters, it has not experienced interventions by independent NGOs.
Finally, financial support for community programmes is provided by some of the nearby factories, for example, PT Kahatex. Incidental donations are sometimes made, for example in the form of a sum of money towards the celebration of Independence Day (*Hari Ulang Tahun Kemerdekaan Republik Indonesia*, HUT KRI). According to local informants, one of the two boroughs, the one closest to this factory, also receives more regular help, which amounts to Rp50,000 per RT per month. This kind of help was negotiated before the factory was established, and formally agreed on. So far it has

been used to repair the alley-ways and to built a new mosque, which was not yet completed at the time of the research.

Factories may also be asked to pay different types of compenzation. During the research we were told that several families living near PT Kahatex received between Rp5,000 and Rp10,000 a month because of disturbance from noise. Another type is contributions to the cost of repairs to damage caused by the operations of the factories. For example, during the period of our research, negotiations were under way between the head of one of the Neighbourhood Associations and factory representatives, to agree to recompense people whose houses had suffered cracks and other damage from the vibrations caused by the plant. But payments are very uneven and promises are not always kept by the factories. For example, PT Insan Sandang, the most recent arrival, had agreed to maintain a distance of at least 1.5 meters between its walls and the village houses when extending its perimeter, but failed to keep the promise.

Administrative units which have not obtained a written agreement on community support from nearby factories are in a disadvantaged positions when negotiating it later. The neighbourhoods located further away from the factories find it especially difficult to obtain any of these benefits, since their claims are not considered justified. This is all a considerable source of anger on the part of sections of the community and of the village administration. In addition, it strongly colours the perceptions that different individuals and groups of people have of benefits and problems caused by the expansion and proximity of the factories. Water is at the very centre of these disputes, as will be discussed later.

3.3.2 Socio-economic conditions

Cintamulya is very densely populated, with 3,316 people per square kilometre. This is clearly a very high population density, especially when compared to the average for West Java, which is 724 per square kilometre; at the same time, it is entirely plausible, considering that Jakarta has a density of 13,964 (Biro Pusat Statistik 1992:282). The village has a total population of 4,311 people, grouped under 786 heads of households. On average, households have 4 members. This is slightly smaller than the average of 4.5 for the country and that of 4.3 for both Java and West Java (*Statistics Yearbook of Indonesia*, 1992). The following table provides information on the age and sex distribution of the population:

Table 3.3 Population of Cintamulya by Sex and Age

Age	Female	Male	Total
0-14	582	525	1107
15-24	567	485	1052
25-34	659	373	1032
35-44	280	255	535
45-54	113	110	223
>55			362

Source: *Potensi Desa 1993/1994*

The high sex disparity in the age range 25-34 can indicate two facts. One is that men of this age group leave the village in search of employment more frequenly than women, the latter finding work in the nearby factories as already stated. The second fact is that in West Java residence at marriage is in the main matrilocal, so the higher number of women reflects the presence of married women setting up home near their parental family.

In addition to this permanent population, the village has what local statistics define as a 'transitory population' *(penduduk sementara*). The term refers to the migrant workers who take up residence within the village for a certain period of time (but not those who live in the factory compounds). However, this period is not specified. In addition, our observations and the survey revealed that marriages take place between locals and in-migrants. The latter are presumably included in the total permanent population. Despite these problems with the data, it may be of interest to mention that according to our census in July 1995 there was a total of 1,209 people in this category, of which 713 were women and 456 were men. The sex disparity among migrants can be taken to reflect the preference local factories have for female workers. Considering that this is only a tiny percentage of the workers who actually live in the area (but reside in factory acccomodation), it can also give a hint of the problems which, according to some local inhabitants, the presence of large numbers of young women on their own bring to the community.

Among the households, village statistics list 709 as being of reproductive age. Among those, 573 or over 80 per cent, use some form of family planning, as shown in Table 3. This compares very well with the acceptor rate for Java, which is 70.2 per centof all married women, and even better with that of 49.7 per cent for West Java (Central Bureau of Statistics 1991).

However, this extremely high acceptance rate is more realistically viewed as a result of the fact that the number of acceptors includes those who belong to the 'transient population', not counted in the official total of households. Discussions with workers and volunteeers of the family planning programme revealed that their services are also used by migrant workers, and that this creates problems with the keeping of records. The rate may also include some of the unmarried migrant workers (though services are supposed to be only for married women), while the official rates refer to married women. This may also explain the extensive use of private family planning, where single women can obtain contraceptives more easily, though at a cost.

Table 3.3 Contraceptive Use in Cintamulya

Contraceptive used	Government	Private	Total
Intra-uterine device	40	14	54
Vasectomy	2	---	2
Tubal ligation	1	5	6
Implant	27	---	27
Injectable		344	344
Pill	101	33	134
Condom	---	6	6
Others			50

The preference of women for contraceptive injections is clear from the fact that 344 women out of 571 acceptors (two of the acceptors underwent vasectomy and hence are males) or 60 per cent use this method. This is much higher than for the whole of West Java, where the percentage of injectable users is 36.6 per cent (Biro Pusat Statistik 1992:295), already the highest in the entire country. The fact that they are prepared to pay for the injection makes the point even more forcefully[13].

13 The cost of one injection is Rp3,500. Users of government-provided contraceptives may also incur a small charge to cover administrative costs; for example, new users of the pill are charged Rp750. Users are also charged for implants which, however, are provided free for those who cannot afford them.

Many women in developing countries find injectables very convenient, since they have to be administered only once every three months. In Cintamulya women appear to have found the use of injectables both convenient and effective, since many of them are engaged in a type of work which cannot easily accommodate pregnancies and the care of young children. As already noted employers prefer unmarrried women and encourage married ones not to have children while in their employment. The employment generated by the factories also deprives these women of the help of the younger female siblings, neighbours and friends who would normally substitute for mothers in these circumstances. Older women seem to be a more frequently available option. Working couples find themselves confronted with the problem of having to make arrangements for child care, both in Cintamulya and in Cisempur. Grandmothers offer the most commonly adopted solution to this problem. In one case a local man and a woman from the town of Tasikmalaya, both factory workers, opted for sending their children to her place of origin, where they could be looked after by her family. In another case, the husband of a factory worker kept his job as a *becak* (pedicab) driver rather than apply for employment in a factory because his hours of work were more flexible and could be better arranged around his wife's shifts, to ensure that one of the parents could care for the children.

According to family planning workers and the staff of the health centres, women used to have on average five children or more, while now they tend to have two. Though clearly this is a subjective evaluation, it would point to a lower fertility rate than that for West Java, which is 3.6 (Central Bureau of Statistics 1991). In any case, the high use of contraceptives by women in the village and the frequent mention of child care problems, point to the fact that industrialization has an important effect on the reproductive perceptions and behaviour of women and couples.

The village has a number of educational facilities. More than 1024 people are listed in the village records as following some form of religious education. In addition, 103 children live in the Islamic boarding school (*pesantren*) mentioned earlier, and 212 attend Islamic schools on a regular basis. Table 4 contains some basic information on educational attainments of the population in terms of secular schooling.

Table 3. 4 Educational Attainments in Cintamulya

Type of school	Persons
Not yet at school	391
Not completed primary school	2700
Completed primary school	780
Completed junior secondary school	365
Completed senior secondary school	57
Completed academy	---
Completed teachers' training	---
Illiterate (ages 10-55)	---

Sources: *Potensi Desa 1994*

The large number of children in primary school can be explained by the fact that the local school attracts children from nearby villages who live in a different administrative unit. At the same time the figure very probably includes the young offspring of the migrants who are so poorly recorded in village statistics. Another picture of educational standards in the village can be obtained by looking at the results of the survey. This shows that of the respondents 62 per cent had completed primary school, 24 per cent middle school and only 1 per cent and 2 per cent respectively had senior secondary or higher qualifications.

In the previous section, the point was made that one of the major transformations affecting the area concerns land use. This is particularly evident in Cintamulya where, at present, only 15.9 per cent of the village land is still rice fields, while 42.3 per cent has been given over to industrial use; the rest is accounted for by housing, public buildings and roads. Patterns of land ownership remain an important issue to be analyzed. The survey showed that nearly half (45 per cent) of the households covered still had a yard; the importance of this will be examined in a later section. A very striking result of the research was the finding that of all households surveyed only 19 per cent own any rice land, while another 26 per cent rent some. Of those who own land, the majority only have very small plots of less than 0.26 square metres. As said earlier, many of those living in the region have sold land during the last ten years. For the case of Cintamulya this amounts to 19 per cent of those interviewed.

Though we lack survey data on the subject, informal interviews and the group discussions indicated that those who owned land before the current industrial expansion used revenue from land sale mainly to build rental accommodation for migrant workers[14]. Thus landed households benefited from

14 Our survey showed that only a very small proportion of the respondents owned and rented out accommodation for workers. It is possible, however, that this pattern may be influenced by the sample design in which only those households with members working in factories were included. It may be that those who rent out houses or rooms are

industrialization through the investment of revenue from land sale. Some, however, preferred to use all or part of such money to acquire land in other districts, since local land prices are far too high for them to buy other land nearby; the purchased land is often rented out. On the other hand, landless or land-poor households were not only unable to take advantage of this opportunity but in many cases lost a well established job with the disappearance of *sawah* land which, in the past had, provided them with employment as agricultural workers. Clearly, the seriousness of the consequences of such a loss depend, for individual household, on the ability of its individual members to obtain other forms of employment. In any case, many people in the communities felt that old patterns of social differentiation may be recreated in the wake of industrialization. In the course of our group discussion the words of a popular song were used to refer to the situation: 'the rich get richer and the poor get poorer'.

More generally, it is important to see how the people in Cintamulya who are of productive age are employed. Since we found village records very poor on this score, we rely here exclusively on survey data. Table 3.4 shows the patterns of employment for all respondents.

Table 3. 5 Main occupations in Cintamulya

Occupation	per cent	women as per cent total
Farmer	9	29
Agricultural worker	1.9	33

households in which individuals do not work in factories, perhaps for reasons of age or status.

Teacher	0.6	100
Food stall owner	0.6	100
Factory worker	34	62
Civil servant	0.6	100
Unemployed	42	54
Other	6.4	10

It is clear from the above table that the factories represent an important source of employment for the local people, and especially for women. Separate survey data also revealed that for women factory work is the most renumerative source of earnings, while for men the income it offers is similar to that which they can obtain from other occupations. The above table also shows other interesting aspects of the employment pattern. One is that agriculture is not an important sector for the local population and that unemployment remains high, again especially for women.

3.2.3 Use of water, fodder and fuel

Water

In the previous chapter the importance of water to Indonesian communities was highlighted. As mentioned earlier, access to water for domestic purposes has become a major social issue in Cintamulya. Therefore then important to look more closely at the changes in water availability and use.

Traditionally water for drinking and cooking has come from wells dug next to the house or, more rarely, inside. This water was also used for bathing and washing clothes or dishes. Our survey showed that ten years before (the time period identified as being before the most dramatic impact from the factories)

65 per cent of the households obtained water from such wells, while another 24 per cent made use of a variety of sources, which included the local river, pond and spring. The water from the wells was considered to be of the highest quality when compared to that from other sources. The regularity of supply was also considered very satisfactory, since 87 per cent of those interviewed stated that the water was readily available in all seasons, and the rest declared it sufficient even when in reduced supply. Furthermore, the wells used in the past were all in close proximity to the house.

The survey showed that nowadays people continue to use well water; 26 per cent of the households in the sample use it for their main, regular supply. But while respondents feel that its quality remains good (and indeed it is because of its quality that people continue to use it), in over 40 per cent of the cases respondent also stated that availability is very poor, especially in the dry season. It should also be noted here that in all cases people have had to dig their wells deeper, from 8-10 metres to about 30 metres. In several cases wells have had to be abandoned and are now used for domestic refuse disposal (thus adding to the problem of air pollution), while in other cases a second well has been dug alongside the existing one.

The reason for this is acknowledged clearly by all. Available water has been diverted by the factories, where artesian wells have been dug in large numbers. Feelings run high in Cintamulya on relation to this issue. Both officials and the population at large are extremely vocal in expressing their anger at the problems they experience as a direct consequence of the presence of the factories.

Household strategies to overcome the shortage of water are diverse. Many people make use of public facilities. For example, in the yard attached to a house owned by people who have moved to Bandung, there is a well which still seems to have abundant water. Women from the surrounding RKs can be seen every day, usually until late afternoon, drawing water to take home after washing themselves and their children. They often queue for over an hour to take their turn. In another neighbourhood in the immediate vicinity of one of the factories, a pond that collects rain water has a portion screened off by a bamboo fence to provides washing, bathing and toilet facilities. The water is extremely dirty and cannot be used for drinking or cooking. Ponds are managed by the users themselves in an unregulated manner. When the mud and rubbish become excessive, the head of the RW is alerted, and neighbours work together for a clean-up. One of the consequences of this situation is that, whereas in the past ponds were used to breed fish (especially carp) for domestic consumption and sale, this activity has completely disappeared from the village.

All of those who stated in the survey that they make use of ponds and rivers to supplement their water supply, felt this water to be of very poor quality. Depending on distance, time and type of transport available, some households (but none in our survey) collect their water from as far away as the spring located on the hills behind the village of Cisempur, a journey or about three or four kilometres each way. This water, being clear, is usually reserved for drinking and cooking.

Two of the factories in Cintamulya have installed connections which bring water to tanks just outside the factory walls, as part of their contribution to the welfare of the community. Some 50 per cent of the households surveyed rely on this type of water. From here individual households can connect narrow PVC pipes to their homes. Here the water is collected in buckets and other plastic containers, and is rarely regulated by a tap. It is clean and can be used for drinking and cooking. The survey revealed availability to be good (for 40 per cent of those interviewed), but more in-depth research showed that water supplied from one of the factories is believed to be untreated and to contain excessive amounts of iron, while that supplied from the other factory appears to be processed before distribution. Many people complained that since the flow is controlled from inside the factories, it can vary according to seasonal changes and to production needs. In some cases individual households are only able to draw enough for drinking and cooking, and still have to rely on other sources for other needs.

Though factory connections provide a source of clean water for several households, many remain excluded. This can be for several reasons. A commonly given one is the cost of pipes and tanks. Others claimed not to trust the quality of the water. Problems also emerge between households which are connected to this water supply, because of mutual suspicions about quantities of water used and wasted. The crucial issue, however, is that since this facility is realistically available much more easily to households in close proximity to the factories, it excludes a great majority of the people who also suffer from a shortage of water from conventional sources. According to our survey data, 91 per cent of the households located in the neighbourhoods in immediate proximity to the factories have water connections, and only 47 per cent of those in the outer ones. With regard to this source of water a very perfunctory observation revealed that the tanks are extremely basic cement constructions, often located next to or on waste land where domestic and other rubbish accumulates. Maintenance is non-existent and most of the tanks show signs of dilapidation.

Unequal access to alternative water sources can be classified alongside the process through which landowners invest in accommodation for migrants as one of the mechanisms which are perpetuating old forms of social differentiation and creating new ones in this community. Our group discussions demonstrated that the community is acutely aware of this, as well as angry at the refusal of many of the factories to respond to their demands concerning water.

Fodder

If water scarcity is an evident and direct outcome of the activities of the factories, other consequences are less obvious but equally important to the life of Cintamulya. The disappearance of land has clearly changed the work structure of the community, putting an end to most agricultural activities. It has to be remembered that only 9 per cent of those included in the survey declared their occupation to be that of farmer and 2 per cent to be that of agricultural worker.

This change has also influenced other ways in which households supplement their incomes and have access to other resources. When many households had rice fields, albeit small in size, several owned water buffaloes for ploughing. With the sale of land, only one local household among those surveyed has large cattle (one buffalo). Similarly, agriculture was well combined with rearing sheep and goats (of which four households were found to have owned between one and six) since the latter could graze on recently harvested fields (one's own or belonging to other farmers) or could be fed with the parts of dry crops unfit for human consumption and other uses. The survey found that no goats are kept now and only 1 household has sheep (two in number) at present. Women's had the habit of collecting fodder when returning from the fields but now they are discouraged from undertaking this activity as it necessitates special trips for the purpose. It is be interesting to note that among those who claimed to own rice fields, the work fell to the husband in 70 per cent of the valid cases, to both husband and wife in 20 per cent and to the son in 10 per cent.

The comment of a respondent is interesting here:

> *Dulu ketika banyak sawah (menggarap), gabah bisa diperoleh secara cuma-cuma ketika (kita) ke pabrik*

> *huller, sekarang harus dibeli. Tanah telah dibeli oleh pabrik Kahatex*
> (When there was a lot of rice land, you could get the husks (to feed animals) by asking when the rice was taken to the huller. Now you would have to buy them. The land has been bought by Kahatex).

The only domestic livestock now reared is poultry. From the survey we learned that nine households still keep chickens (between one and twelve in number); this is not greatly different from the situation found in earlier times. Ducks, on the other hand, have followed the fate of larger animals and are not kept by any of the households in the survey.

It is not only the disappearance of rice land that has influenced this aspect of village life. Employment in the factories is clearly an importance source of income, but the long and regulated working hours inevitably limit the time people have to devote to agricultural and related tasks. As the survey showed, people spend much less time in collecting fodder than they did before: 70 per cent of those involved in the task spend less than one hour in carrying it out, while in the past this was so for only 25 per cent. Ownership of a home-yard facilitates combination of the various activities; for example, the survey showed that among those who have a yard, 45 per cent use it to rear domestic animals.

Fuel

In an earlier part of this chapter the point was made that this area had already been affected by the twin processes of industrialization and urbanization, and that in some cases the recent changes simply represent a deepening of existing tendencies. This was found to be the case in the shift from wood to kerosene for cooking.

Among the households surveyed 79 per cent use kerosene for cooking, 19 per cent wood and 3 per cent gas. In the majority of cases (79 per cent) the fuel is delivered to the house. When collected, wood is obtained from sources fairly close to home (less than a kilometre in 96 per cent of the cases). When questioned about earlier times the majority, or 53 per cent of the households, declared that they used wood, while the rest used kerosene. Then, as claimed by 45 per cent of the respondents, wood had to be collected and carried home. The time spent now on this occupation is clearly less; 67 per cent of the respondents give less than one hour to this task compared to 28 per cent in the past.

The are several reasons why people have switched from wood to kerosene. One is that kerosene is more practical (*praktis*) to use as it requires less supervision. In the past, however, supply was irregular and the cash necessary to buy it less readily available. A response given to one of the open-ended questions used in the survey is revealing:

> *Sekarang lebih mudah mendapatkan minyak tanah* (*asal ada uang*). *Kalau dulu meskipun ada uang kadang-kadang minyaknya tidak ada di warung.*
> (Now it is easier to get kerosene (if there is money). In the past although there may have been money, sometimes there was no kerosene in the local shop).

Another reason for the shift relates to availability of wood. Again in the words of a respondent (which many others echoed) :

> *Susah mencari kayu bakar, karena sudah jarang ada kebun-kebun tempat untuk mencarinya.*
> (it is difficult to find wood because there is any land from which you can get it).

3. 4 Cisempur, A Rural Community?

There is a great contrast in leaving Cintamulya behind and reaching Cisempur, though the distance is only two kilometres. The village is on gentle slopes, and its path are steep but shaded. Houses are surrounded by yards where shrubs and bushes grow. The air is generally cooler, especially at night, and devoid of the constant buzz and hum of traffic and factories. It is located at about 700 metres above sea level and receives an average of 2000 mm of rain per year, which together with its altitude accounts for its fresher environment.

3.4.1 Geographical Conditions and Infrastructures

To the north of the village lies the village of Jatikore, to the west the village of Jatimukti and to the east the village of Mangunarga (sub-district of Cimanggung). To the south lies Cintamulya, which can be reached on foot in about 20 minutes and in 5 to 10 minutes by motorized transport.

Cisempur, of which Cintamulya was originally part, has a considerable history. One of the older inhabitants, who was himself head of the village between 1955 and 1971, remembers the Dutch colonial administrators appointing the very first incumbent to this post. During the years of the struggle for independence , the village was the base for two well known guerilla units, the Swift Unit (*Kesatuan Kilat*) and the Flying Horse Unit (*Kesatuan Kuda Sembrani*). At the time of the research the village was engaged in the process of electing its new *Kepala Desa* or *KADES* (village head), the last one having ended his term of office already a year before. This appeared to be a process fraught with issues, the campaign being fought around the negotiations with the encroaching factories to ensure safeguarding employment and water for the local population.
Administratively, the village is made up of two boroughs (*dusun*), 5 hamlets (*kampung*), 9 village associations (*Rukun Kampung* or RK) and 23 Neighbourhood Associations (*Rukun Tetangga* or RT). Borough 1 contains the hamlets of Wates, Sirah Cai and Karasak. Borough 2 includes the hamlets of Cisempur and Baturumpil. The village has a total population of

3,287 persons in 812 households, with an average household size of 4 members. Cisempur is larger than Cintamulya. Village records give the population density as 1,836 people per square kilometre, nearly half of that of Cintamulya but still extremely high even by West Java standards.

Observation reveals that more houses than in Cintamulya are non-permanent in nature, the number being 478 out of 878. Of the rest 75 are semi-permanent and 325 permanent buildings. A total of 778 have electricity, which represents 88,6 per cent of all domestic buildings. Cisempur has several buildings for public use. They include two primary schools and two junior high schools (*Sekolah Menengah Pertama* or SMP). Two religious boarding schools (*pesantren*) are open to both local students and outsiders. In addition to this, there are five mosques and 22 prayer houses, which provide for the religious needs of the community. Health services are provided the Community Health Centre (*Puskesmas*) mentioned earlier, which also serves Cintamulya and Jatimukti. Of the three permanent staff members of the Health Centre, one resides next to it, so that it is easier to coordinate its activities with the Division of Health (*Seksi Kesehatan*) of the Village Resilience Organization (*Lembaga Ketahanan Masyrakat Desa,* or LKMD).

Like Cintamulya, this village too has other community organizations, in addition to the LKMD. The Family Welfare Organization (*Pendidikan Kesejahteraan Keluarga,* or PKK) has one mobilization team and a number of organizational teams. Women are also involved in groups for religious study (*Kelompok Pengajian*), while young people gather in the Neighbourhood Youth Association (*Karang Taruna*). Despite the presence of these organizations, several members of the community, especially religious leaders, appear to feel that the participation of people in the activities of such organizations is declining steadily. One of the reasons was identified as the fact that most adults are away from the village for work, especially in the factories, and thus have little flexible time to dedicate to the community. The same comment was made in connection to *gotong royong*, the system of mutual aid through which people in the past participated in community and even private activities, such as maintenance of roads or house repairs.

Interventions from outside are brought by training institutions through the Community Service Program (*Program Kuliah Kerja Nyata*, or KKN). This is active, for example, in the field of agricultural extension. Students from the State Institute for Islamic Studies (*Institut Agama Islam Negeri*) have, for example, assisted the community with repairs to damaged water holes around the Sirah Cai spring and with the upgrading of other community facilities. The government also has an Old Age Assistance Programme (*Program Bantuan untuk Orang Jompo*). As in the case of Cintamulya, Cisempur has not yet experienced interventions from non-governmental institutions.

It should be noted here that none of the financial or other contributions made by the factories to communities or individuals has reached Cisempur, given the greater distance. However, the effects of their presence is already being felt, as will be discussed below.

Perhaps the most striking difference between Cisempur and Cintamulya is land use. In the case of the former the greater part of its land totals 176.3 ha, is still agricultural just over 75 ha being occupied by irrigated rice fields and 76.7 ha by plantation crops. Human settlements cover 25 ha and the rest is given to roads and other public facilities. Thus land for agricultural purposes still amounts to 86 per cent of the total. It should be remembered that the comparable figure is only 16 per cent in Cintamulya, where the largest portion, or 42.3 per cent, has been given over to industrial use. In the course of the research, it became known that 60 ha of land belonging to the

village has been earmarked for industrial use and that several landowners have already sold portions of their plots. However, official records do not contain this information. Though we have no information about sales of land to outsiders, the survey revealed that 32 per cent of those interviewed (more than in Cintamulya) had sold *sawah*, and that of these over 70 per cent had done so during the last ten years.
While the factories which are now situated at a distance of about 3 km are making their presence felt both directly and indirectly in Cisempur, these impacts will be greatly magnified when plants are built much closer to the village.

3.3.2 Socio-economic Conditions

As mentioned above the village has a total of 3,287 people. In terms of age and sex, they are divided as shown below

Table 3. 6 Population of Cisempur by sex and age

Age	Female	Male	Total
0-14	644	622	1266
15-24	355	339	694
25-34	262	251	513
35-44	186	164	350
45-54	178	158	336
>55	68	61	129

The total population is obviously smaller than that of nearby Cintamulya, but another difference in their demographic profile is interesting. In the group 25-34 age the sex imbalance in favour of females is much less pronounced than in the neighbouring village. This may support the first of the two hypotheses offered earlier for Cintamulya, namely, that the much higher number of young women may be accounted for by migrant (female) workers living in the community and who have 'crept' the official statistics. According to informants, only a maximum of around 50 migrant workers are in residence in Cisempur at any given time.

Another interesting aspect of the population distribution of Cisempur is that a larger proportion, 38.5 per cent of the total as againts 25.6 per cent in Cintamulya, consists of children under the age of 14. This may indicate that in the last decade people in Cintamulya have been responding to the more readily available opportunities in factory employment by having fewer children. It is interesting in this context to look at the use of contraceptives in Cisempur, shown in Table 3.7

Table 3. 7 Contraceptive use in Cisempur

Contraceptive used	Government	Private	Total
Intra-uterine device		57	57
Vasectomy		5	5
Tubal ligation		6	6
Implant	9		9
Injectable	300		300
Pill	100		100
Condom			
Others			

Of the 624 households listed as being of reproductive age in medical records, 477 use some form of contraception. If the five vasectomies are ignored, this represents 75.5 per cent of women of reproductive age, which is less than those in Cintamulya. This could be seen to confirm the point made above, that women in Cisempur are limiting their fertility to a lesser extent than to those in Cintamulya.

Although there is little difference in the types of contraceptives used, it is difficult to account for the differences in preferences for private versus public providers between the two village. One explanation could be that since the *Puskesmas*, from which women can obtain contraceptives more readily and consistently, is located in Cisempur, women from Cintamulya may find it easier to rely on nearer private sources for the three-monthly injections.

The population of Cisempur has access to broadly similar educational facilities to those of Cintamulya. Table 3.8 gives official statistical details of the level of schooling attendance in the village.

Table 3. 8 School attainments in Cisempur

Education	Numbers
Not yet at school	536
Not Finished Primary School	48
Finished Primary School	1543
Finished Junior Secondary School	423
Finished Senior Secondary School	54
Finished Academy Training	8

Finished Tertiary Education	4
Illiterate	5

Because of the unreliability of this information, it preferable to make use of the data collected during the research. From the survey it appeared clear that while many individuals (62 per cent) have completed primary school, the percentage decline to 30.4 per cent for middle school and to 3.4 per cent and 0.5 per cent respectively for secondary and tertiary education. This pattern matches fairly closely that found in Cintamulya.

Despite the fact that land use Cisempur is still predominantly agricultural, the percentage of people who own *sawah* is small, only 12 per cent of those interviewed in the survey (even less than in Cintamulya, where the figure is 19 per cent are land-owners), while 36 per cent rent land. This can be explained by the fact that, as we were told by local officials, much of the land is owned by outsiders. Nonetheless, that the rural appearance of the village is somehow misleading is confirmed by the fact that only 9.8 per cent of our sample are farmers (compared to 9 per cent in Cintamulya), and another 4 per cent are agricultural workers (compared to 2 per cent in Cintamulya). Thus, despite the fact that there is still plenty of agricultural land around the village, working patterns have become very similar to the more urbanized neighbouring Cintamulya. This similarity is clearly shown in Table 3.9.

Table 3. 9 Main occupations in Cisempur

Occupations	per cent	Women as per cent of total
Farmer	9.8	30
Agricultural worker	3.9	38
Teacher	0.5	0

Motor driver	1.5	0
Labourer	1.5	0
Foodstall owner	1.0	50
Factory worker	29.4	58
Civil servant	1.0	0
Unemployed	48.0	57
Others	3.4	14

As is the case in Cintamulya, here too agriculture is not a sector on which people rely greatly for a living. On the other hand, industrial work is important as a source of employment, especially for women, though the proportion of factory workers who are female is, at 58 per cent, smaller than the 62 per cent in Cintamulya.

3.3.3 Water, fuel and fodder

Water

From the survey carried out in both localities, it emerged that the water used for domestic purposes in Cisempur is mostly from wells, which provide water to 59 per cent of the households in the sample (28.9 per cent in Cintamulya). Another 26 per cent are served by the local spring, while 12.2 per cent depend on a mixture of sources. As in Cintamulya, the majority of well users thought the water to be of very good quality and the supply reliable (though less so in the dry season). Here, too, there have been changes since five to ten years ago; data show that then over 70 per cent of the households relied on well water, and 17 per cent on the spring. The fact that a smaller percentage now relies on wells and that of those who do, 47 per cent have had to dig deeper for water, is a clear sign that the activities of the factories are having an impact here too. This is confirmed by other information obtained from the community. For example, while many answered the open-ended questions included in the questionnaire by stating that there was no change or problem with water, several others felt differently. A frequent comment was that :

> *Dahulu air untuk masak dan keperluan rumah tangga bisa dipenuhi dari sumur sendiri, sekarang harus diambil dari sumur umum dan air minum dari mata air umu.'*
> (In the past the water we needed for cooking and other domestic uses could be obtained from our own well; now we have to bring it from the public well and the drinking water from the spring).

Clearly Sirah Cai, the nearby spring, has become a much more crucial source of water than ever, especially for drinking water. This is not only because wells have become less reliable but also because, as it appears from our group discussions, local people had access to a number of other springs located in the forest, it was open to the public. At the same time, many informants seemed to think that Sirah Cai gives less abundant water then before.

A few years back, a holding tank was built next to the spring with money collected from the community; from here pipes take water to smaller tanks in each neighbourhood. Several households have connected pipes which bring water directly from the spring to a tank located either inside or outside their house. This is used for all domestic needs, including drinking. In most cases, there is no mechanism to regulate or stop the water, which at times overflows and runs freely into the roadside ditches. Other families are prevented by financial considerations from installing a direct connection. They continue to rely on their wells, or to carry water manually from the spring.

The spring is easily accessible from the village, though located at the top of a fairly steep path. It is not fenced or covered over.

The area surrounding it is kept rough but reasonably clean by the owner of the land, who derives an income from the sale of the bamboo trees around the spring. Also, it has long been a convention to make occasional gifts of money to the landowner for the privilege of taking water.

According to key informants, the progressive deterioration of the wells and the experience of nearby Cintamulya have made both the community and its leaders very aware of what may be in store for the future. As a consequence, the current discussions concerning the election of the new head of the village revolve very much around the necessity of selecting candidates able to deal with this issue. This refers both to the establishment of a more adequate system for the maintenance and upkeep of the spring and to negotiations with factories for possible financial and material compenzations and contributions. The second issue around which prospective candidates try to campaign and are being evaluated, is their capacity to ensure binding commitments from the factories regarding employment for local people.

Fodder

Cisempur is a much more rural community than Cintamulya, at least in terms of land use. The presence of agricultural land was discussed earlier; here we need to add that from the survey it was clear that most households (83 per cent) still have and use their home-yard, as against 45 per cent in Cintamulya. Land of both types can provide resources such as fodder and space for the rearing of domestic animals as well as create a need for them, at least for traction power.

Our survey revealed however that the situation is much more similar to that of the urbanized Cintamulya than these characteristics would lead us to believe. No household in the sample owns buffaloes and only two own goats. However, seven households have sheep (in numbers between one and six) and several others keep up to 20 chickens. Ducks too are kept by several people also up to 20 in number. All animals can be fed with a combination of household refuse and purchased and collected fodder. Though the distances covered in gathering animal fodder have not changed, it is clear from the survey that the time spent weekly on this occupation is now considerably shorter. Today 57 per cent of those engaged in this activity spend less than one hour per week collecting fodder, whereas in the past only 8 per cent could complete the tasks as quickly and the majority required a much longer time.

Though there are people in Cisempur who maintain a more rural life style, it is possible to say that the engagement of the local population in occupations other than agriculture, rather than the changes in land use, is leading to the disappearance of certain aspects of rural life[15]. In the words of a respondents:

> *... karena tidak ada yang mengambil rumput lagi, maka saat ini tidak berternak*
> (Since there is nobody to collect fodder any more, we don't keep cattle).

More generally, despite the visual and aesthetic differences between the two villages, there is a strong convergence in the transformations the two villages are undergoing.

One remaining difference relevant here is the survival of home-yards, mentioned above. The location of the two villages explains this difference at least in part. In Cintamulya the recent and rapid investments in buildings for migrant workers have destroyed the green spaces though a few still surround some of the village houses. So far, this has not happened in Cisempur, where there has been little or no demand for accommodation for outsiders. This means that the *pekarangan* still represents a space on which to keep small animals such as

15 It should be remembered that factory workers from Cisempur have further to travel than those from Cintamulya, and this adds time to their working day.

sheep and chickens, as well as a source of the usual additions to the diet and general welfare of the households in the form of edible and medicinal plants, fruit, flowers and shade. The space offered by the *pekarangan* is also crucial for additional income generated in some households from the sale of tobacco, since the latter has to be dried on large trays, which take up considerable space.

Fuel

In one aspect of it use of natural resources, namely in the consumption of wood fuel, Cisempur remains anchored to its rural roots. In our sample 42 per cent of the household continue to use wood for cooking, while 56 per cent have adopted kerosene. This still represents a decline from the past (from a previous 80 per cent), but not on the scale found in Cintamulya, where only 19 per cent of the sample households still use wood. Time spent on this activity has, as a consequence, declined though less than in Cintamulya. The survey showed that while 57 per cent of the respondents for whom this question was applicable now spend less than one hour a week on this task and 42 per cent between one and three hours, in the past only 4 per cent spent less than 1 hour, and the rest anything up to 10 hours a week

The continued reliance of the local population on wood can be explained by the continued existence of home-yards and, above all, by the fact that the village is still surrounded by fields and plantations from which waste material suitable for burning can easily be obtained. In the past, the forest which covers the higher slopes of the hills behind the village provided abundant wood, as well as other useful materials. These slopes were recently purchased by the state and turned into a conservation area. Even more recently guards have been placed around the forest to protect it. The effect of this is being felt by the villagers, who are prevented from using the land to grow dry crops and to collect materials. Several stated that:

> *Sekarang agak susah mendapatkan kayu. Karena lahan tempat mencarinya sudah jadi hutan lindun.'*

> (It is difficult to get wood because now the place from which we used to get it has become a protective forest).

As shown in our group discussions, people appreciate the necessity of protecting the forest from over-exploitation. However, it remains to be seen whether they will accept the fact that the forest is not accessible to them just at a time when they feel considerable pressure to sell their land for the construction of factories, or whether they will try to defy the conservation order and the physical barrier represented by the guards.

3. 4 Forms of Intra-household Adaptations

In the preceding sections, the major effects of industrialization on natural resources were described, together with the overall strategies adopted by households in each village to satisfy their needs. In order to move nearer to answering the central questions of the research, it is necessary to look more closely at the intra-household shifts in relevant duties and responsibilities.

From Table 3.10 an idea can be gleaned of the degree to which different members of the household are responsible for collecting water from wells, and how this compares with the situation of few years ago.

Table 3. 10 Changes in water-related tasks in Cintamulya and Cisempur, as per cent of total

Person Responsible (a)	Cintamulya Past	Cintamulya Present	Cisempur Past	Cisempur Present
Wife	36	36	22	28
Husband	23	16	20	13

Husband and Wife	18	26	10	6
Son	---	---	---	19

(a) person responsible included only when appearing for more than 5 per cent of the total.

Clearly water-related tasks are either shared or a women's responsibility. However, the group discussions and other more informal methods of data collection gave a strong indication that in the communities the feeling is that this is a man's job. In longitudinal terms women's work in water collection in both villages has either stayed the same or has slightly increased. The responsibility for collecting water from wells has shifted away from the husband on to the husband-wife team or, in Cisempur, to sons. This could be explained by the fact that, because of the problems associated with scarcity of water, women are adopting strategies which result in the withdrawal of men. For example, women who now use a public well (as a consequence of their own being dry or inadequate) may combine the collection of water with washing dishes and clothes and with bathing small children, all activities rarely undertaken by men. It is important to note that, as will be explained below, water collection is one of the tasks where women feel that men (including paid workers) contribute more as a consequence of their own engagement in factory work. The increase in the participation of sons in Cisempur is noticeable (as is the total absence of daughters' participation in both villages), and can be explained by the increase in the use people are making of the spring; though there is no data to support this assertion, it could be that young men and boys are deemed more suitable to this physically demanding and public task.

Similar shifts appear for tasks related to the collection of fodder for animals, Table 3.11 shows

Table 3.11 Changes in fodder-related tasks in Cintamulya and Cisempur, as per cent of total

Person responsible (a)	Cintamulya Past	Cintamulya Present	Cisempur Past	Cisempur Present
Wife	13	20	17	20
Husband	46	30	67	40
Husband and Wife	8	---	17	---
Son	17	20	---	40

(a) person responsible included only when appearing for more than 5 per cent of the total.

In the case of work related to the collection of fodder for animals, it again appears that more women are involved now than in the past, while the reverse is true for husbands, in both villages. It is possible to speculate that the shift here is due to the fact that since in Java men are more often responsible for tending larger animals (see Chapter 2 of this report), the disappearance of cattle from the area means that the work input of husbands is not needed, while that of the wives remains important because they are traditionally in charge of tending small animals such as chickens. More sons appear to help now than in the past in both locations, as is the case with water related tasks. Unfortunately the available data do not allow us to differentiate between sons of different ages, and thus to detect a meaningful relation between this information and unemployment among younger men. Informants seem to believe that unemployment is particularly acute among men between 14 and 19 years of age, thus the possibility exists (though cannot be tested) that the help of unemployed sons in this age range is enlisted in various tasks related to water and fodder collection, because they have time on their hands.

From the descriptions and analyses of the preceding section, it should be clear that there has been a considerable change in the use of domestic fuel within both communities. What this has meant for the intra-household distribution of tasks is shown in Table 3.12

Table 3. 12 Changes in fuel-related tasks in Cintamulya and Cisempur, as per cent of total

Person responsible (a)	Cintamulya Past	Cintamulya Present	Cisempur past	Cisempur Present
Wife	38	44	13	21
Husband	46	14	46	21
Son	---	11	---	---
Daughter	---	11	8	24

(a) person responsible included only when appearing for more than 5 per cent of the total.

Information concerning the collection of fuel again reflects broadly similar patterns. The decline in the contribution from husbands is easily explained by the decline in the use of wood as domestic fuel, especially in Cintamulya. However, the fact remains that women have to compensate for this, with the help of both sons and daughters.

The point has been made above that the link between rapid industrialization and changes in the use of natural resources is to be found both in the transformation of land use, and in the fact that individuals are engaged in a form of employment (wage work in factories) which cannot be easily combined with tasks and responsibilities connected to the utilization of resources. Given that women are employed in factories in larger proportions than men and that tasks related to natural resource use are intimately linked to housework and other household-based responsibilities, it is important now to look at the shift in the domestic sphere more broadly.

One of the open-ended questions included in the survey concerned recent changes in the contribution that husbands make to housework. Discounting the 34 respondents for whom the question was not relevant, a large majority (21 out of 46) of the rest, stated that the husband was helping much more in the home since the spouse had started working in a factory. In some cases husbands were said to help with cleaning and tasks in the kitchen. It is also clear that husbands give less support in the work of washing, cooking and feeding animals. As one woman said:

> *Setelah ada pabrik, suami saya membantu mengambil air*
> (Since there has been a factory, my husband helps with collecting water).

An interesting counterpoint was provided by several respondents who considered their husband's contribution to have declined because they had taken up more intensive paid work, because their help in collecting water was no longer needed because of the connection with the factory supply, or because their help in looking after cattle or collecting fuel for cooking was made unnecessary by the disappearance of both. These comments match more closely the findings of the survey concerning the decline in the contribution of husbands to these tasks. One woman stated:

> *Jika pada jaman dahulu suami saya suka membantu mencari kayu bakar, tapi sekarang kayu bakar sulit didapat, jadi kami menggunakan kompor minyak*.
> (In the past my husband helped in looking for wood, but now it is difficult to find wood, so we use kerosene).

Another stated that 'once my husband used to bring water from the well, but now that there is water from the factory, he does not need to carry well water'.

In an earlier chapter, the point was made that children in Java often represent an important source of labour for housework and other domestic tasks. It was of interest to this research to see whether changes could be detected in the extent that this has applied to the research communities since the arrival of the factories. In both villages, some of the responses to relevant questions pointed to the fact that a comparison could not really be made, since many of those who were children 5 to 10 years ago are adults now. However, in many cases parents relied on their children for collecting water as well as fuel and fodder, and for helping with household chores. Girls as a rule are more likely to be engaged in tasks like cleaning and cooking, while boys lent their help more readily in cleaning, feeding animals and collecting wood.

Many of the responses pointed to the fact that such help was particularly necessary now that the wife worked in factory:

> *Sekarang anak sudah bisa membantu, terlebih kalau ibu sedang sift pag.'*
> (Now one of the children is old enough to help, especially if mother is on the morning shift).

The opposite situation was also found; for example one of the respondents stated:

> *Sebelum anak saya bekerja di pabrik, dia sering membantu pekerjaan rumah tangga, sekarang setelah bekerja di pabrik menjadi jarang membantu*
> (Before my child worked in the factory, I received a lot of help in the house, but now this rarely happens).

To summarize, the changes brought by industrialization to natural resource availability have necessitated certain adaptations in task distribution within households. The nature of labour demand has meant that local women participate in industrial employment in considerable numbers. Tasks within the household have had to be negotiated as a consequence of the above transformations. Those directly related to the use of the three natural resources have seen on the whole a decrease in the contribution of men to this work, but a sustained and even increased contribution by women, often helped by sons or husbands. At the same time, is clear that most of these tasks entail less time and this means a lighter burden for those responsible for them. The exception to this is water, though this is true for some households (those connected to the factories or those, mostly located in Cisempur, who still enjoy abundant water from their own wells) but not for others. For the latter, obtaining water still remains a arduous task which demands hard work, patience and creativity. Also important is the fact that in the more general household tasks men and children are contributing more than they did in the past.

CHAPTER 4

A COMPARISON FROM CENTRAL JAVA

4.1 Introduction

The aim of this chapter is to expand the scope of the research and test whether the changes and problems which appear to be consequences of industrialization in the West Java locations can be considered to be exceptional, or whether some features can be found common in another region of the country.

In this chapter brief descriptions of two villages in Central Java (see Map 3) are given, with emphasis on the main aspects of the impacts which the industrialization process has had on them. As in the case of the West Java sites, the two villages differ from each other in the extent and depth of the penetration of factories and in physical distance from them, and thus in the relative impact on natural resources and social relations. Information on the villages was collected in broadly similar ways to those for the West Java sites, though with a smaller team of researchers and generally with a much more

Map 3
Sukoharjo District

limited project in mind[16]. The details of the methodologies employed described in Chapter 1. It should be repeated here that part of this methodology included a specific notion of participation, in the sense of providing another non-governmental organization active in research and advocacy in the field of environment and gender, with the opportunity both collect information useful to these activities and to gain experience and skills in new research methodologies.

Central Java[17] differs from West Java in many ways. It is a Javanese, rather than a Sundanese region, and hence the

16 Given the very small sample and the methodology chosen for its selection (see Chapter 1), the data from the survey used in this chapter are not deemed to be representative but only indicative of situations and differences between the two villages.

17 This section relies on information from Hill (1991).

language and traditions of its people are firmly located within Javanese culture. In daily exchanges people communicate by using mostly *Ngoko* (the form of the Javanese language used to address people of lower status) or *Madya* (the form used to address people of similar status), and more rarely *Krama* (the honorific form).

The region's most dynamic economic sector in recent decades has been agriculture, and especially the production of food crops. Also dynamic have been transport, trade and public services. In an earlier chapter it was stated that industrial growth in Indonesia is characterized by high geographical concentration. Central Java has received little of the new manufacturing investment, and its industrial production remains largely concentrated in the small and medium sectors.

In terms of social indicators, Central Java has historically been among the poorest of the Indonesian regions. In the last two decades, however, it has undergone considerable improvements, including accelerated declines in fertility and infant mortality, as well as advances in life expectancy. Another characteristic of the region is the very high labour force participation of women, which in the mid 1980s was 46.7 per cent of the total, compared to 38.3 per cent for Indonesia as a whole.

Both the villages selected for this research are located in one of the twelve sub-districts in the District (*Kabupaten*) of Sukohardjo. The district is situated roughly in the middle of the province, and borders Surakarta to the north, Karanganyar to the east, Wonogiri and Gunung Kidul to the south, and Boyolali and Klaten to the west. Although agriculture still dominates, the industrial sector has grown considerably since the early 1980s. At that time, the decision was made to move all industrial enterprises from the district of Surakarta to other districts. Sukohardjo now ranks second, after Karanganyar, in industrial production. Textiles dominate this sector, though there are still small and medium factories producing construction material, food products and traditional medicines.

The two villages where research was carried out lie side by side (see Map 4), Jetis being to the east of Combongan. The crucial geographical difference between the two villages is that Jetis is only two kilometres away from the town of Sukoharjo, capital of the district, while Combongan is divided from it by the width of Jetis itself and the distance from the town is about five kilometres. The proximity of Jetis to Sukoharjo is the reason why factories have sprung up in its vicinity, finding the facilities and infrastructure of the town attractive, especially those related to transport and communications. A similar situation occurs in Cintamulya, West Java, in its proximity to Bandung and to major means of communication. Furthermore, Jetis is located immediately opposite the factories, making it very attractive as a place of residence for their workers.

4.2 The Factories

Three factories dominate the landscape of Jetis, in such close proximity to each other as to be in the same compound. The first two are domestic companies *(Penanaman Modal Dalam Negeri* or PMDN) producing textiles. The first of to be set up was PT Sukoharjotex owned by an Indonesian of Chinese descent it was established in 1982. It produces textiles, primarily woven cloth, for national markets and employs 1,982 people, of whom 60 per cent are women, usually first within the district. PT Sritex followed in 1985, its shares mostly owned by the former enterprise. It produces a wider variety of goodswhich range from yarn to grey and finished cloth, dyed and printed fabric and

Map 4
Desa Combongan & *Desa* Jetis

finished garments. It has 11,140 employees, of whom 4,200 are male and 6,914 are female. Most of the workers are from outside the district, 21 per cent from nearby Wonogiri. A third factory was set up in 1993, again with ownership common to the other two. This is PT Wahana, which produces the cardboard reels on which yarn and cloth are wrapped. These are mostly for use by the other two factories, though markets further away are also reached. It employs 300 workers, most of whom are women.

According to factory personnel interviewed for this research, recruitment practices in the firms are fairly simple. Information concerning job availability circulates freely within the community. Those interested have to submit a written application together with a number of documents and a covering letter. Candidates are selected through interviews, but no special tests are carried out. Again according to information received from factory personnel, the educational qualifications of workers vary from high school certificates to completion of primary school. Specific technical qualifications are found only among workers assigned to machine operations or other skilled jobs. The large majority of workers are below the ages of 25-30; in PT Sritex nearly 70 per cent are between 17 and 25. Production is carried out in three shifts, including a night one which finishes at 11 p.m.

Wages are paid on a piece-rate basis and range around Rp90,000 per month, after all deductions have been made for the provision of food and for the contribution to the Workers Insurance (*Asuransi Tenaga Kerja,* or ASTEK) and to the Indonesian Workers Union. Workers are provided with uniforms, two sets of which are given to them every year. They have access to work canteens, for which they have to pay. There is also a medical centre in each of the factories to deal with minor injuries and illnesses. On paper, the factories grant their female workers both maternity and menstrual leave, but workers stated that in practice neither are claimed or granted. Despite these facilities, it was clear from our observation that workers tend to move frequently between factories (these and others in the region). The explanation given by those interviewed was that since demand exists, workers move in search of better pay and conditions, or else change jobs when life-cycle events (marriage, for example) necessitate a break and then the resumption of work.

Many of the workers whose homes are not in easy reach of the factories, reside in the facilities provided by the firms (with the exception of PT Wahana, which does not offer either transportation or accommodation to workers). For example, at the time of the research, PT Sukoharjotex provided accommodation for 300 female and 50 male workers, while PT Sritex had 12 'lodges', each of which could accommodate between 150 and 180 workers. White collar and technical personnel have access to better standard housing, referred to as 'service accommodation', available both for individual workers and for those with families. As is the case for the West Java location, many workers prefer to reside with local families rather than to take advantage of the facilities offered by the firms. Those interviewed for the research stated that they find the rules which apply within the factory compound too restricting, for example, having to report to the factory security guards each time they leave or return to their accommodation.

A room can be rented from local families for Rp3,000 to 5,000 per month. Accommodation of this type is sometimes within the family home, rather than in a specially constructed building. This appeared to researchers to occur more frequently than in the West Java case, where most rented space is purpose-built and separate from the family home. This type of arrangement applies more often to women than to men and seems to suit both the workers, who particularly because of their young age may prefer a family environment, and the families, which assume a protective attitude in relation to the girls. In one of our case studies, a worker living with a local family was so integrated in to the daily life of its members that she shared the housework. Despite this, there is still plenty of social exchange between young, single, migrant workers, and between these and local residents. It is in this sphere that some social problems have emerged whitin the community, as will be discussed below.

The land on which the factories were built was initially office land (*tanah bengkok*). The revenue from the sale was used by the village administration to acquire land in another place, so that office land would still remain at the disposal of the village. As the factory concerned looked for more land to expand on, private land (mostly irrigated rice-land) was sold by different people; the sales were coordinated by the village administrator. Prices have obviously increased with the increase in demand rising, from an initial Rp10,000 per square metre in the early 1980s, to between Rp35,000 and Rp50,000 at the time of the research. Further expansion is made possible for each plant by the fact that there is ample land around them, still under cultivation. Factories are not the only buyers of land. According to local informants, investors from the town are buying home-yards and other plots close to residential areas, in order to build accommodation for workers. The price varies between Rp50,000 and Rp150,000 per square metre, according to proximity to the main road.

4.3 Economic and Social Conditions

Since the two villages are located at only a short distance from each other, they share many similarities. However, their location in relation both to the town and to the factories has given rise to certain marked differences, which will become apparent in the sections below.

4.3.1 Jetis: an urbanized village

Jetis is situated 2 km north of the town of Sukoharjo, hence literally at its outskirts (see Map 4). The village comprises 16 hamlets (*dukuh*), 8 village associations (*Rukun Kampung*) and 26 neighbourhood associations *(Rukun Tetangga*).

Jetis occupies 192.2 ha of land, of which 121.6 ha is taken up by housing. This fact, which already reveals the urban nature of the village, stems from its proximity to the district capital, rather than the penetration of factories, which it preceded but which exacerbated it. The village has a population of 5,929 people residing in 1,325 households, which gives an average household size of 4.4 members. Households are thus smaller than in the West Java cases.

The small role played by agriculture is confirmed by our survey, which showed that only three households (20 per cent) owned land, although a bigger proportion (87 per cent) had a *pekarangan*. Land ownership does not appear to display any marked concentration, and an average of 4,000 square metres seems to be common for such plots. Discussions with farmers confirm that in the past a much larger percentage of the population owned and worked their own land. As in the case of the West Java sites, those who have sold land, for either industrial or other uses, have bought replacement plots outside the area, which they rent out.

Official statistics show that nearly 10 per cent of the total population has completed primary school, 15 per cent is still attending school at this level, 60 per cent has completed secondary school and just over 9 per cent has completed some form of tertiary or specialized course of studies. Another 10 per cent have either not gone to school at all or have not completed primary education. These relatively high educational standards have allowed a good proportion (25 per cent) of the active population to have access to jobs in the public service, for which formal qualifications of a certain standard are always required.

Schools are easily accessible, since the village has two religious education centres and several secular ones: five for pre-school children and five primary schools, as well as four middle and five high schools. There are also 19 mosques and prayer houses, and one church, testifying to a situation of more diversity in religion than the West Java site. Despite the urban nature of the village, 326 of its houses are still built of traditional materials such as wood or bamboo. The majority, or 656, are permanent brick constructions. Health facilities, which are adequate in number, are also easily accessible to most of the population. In addition to two small maternity hospitals, there are over 200 traditional and/or trained midwives in the locality as well as eight doctors practising privately.

According to data available locally, there are 732 users of family planning services in Jetis. They are classified as follows, according to type of contraceptive.

Table 4. 1 Use of contraceptives in Jetis

Type of contraceptive	No. of acceptors
Pill	124
IUD	383
Condom	21
Other	221

The data are not very accurate, however, especially since the large number of those using 'other methods' is difficult to match to other contraceptives available. The considerable numbers of IUD users also contradicts the fact that informally women expressed preference for the Pill and a great deal of fear in relation to IUDs.

The village is served by an abundance of public transport. Many local residents also have private vehicles, often used for commercial purposes. These include bicycles (150), motorcycles (103), cars (6), minibuses (13) and trucks (4). Local inhabitants are also well supplied with other means of communication;

according to official statistics, there are 72 radios and 117 televisions in the village.

The village also enjoys the benefits of the presence of institutions outside the formal administrative structure, as it is the case in the West Java sites and in most Indonesian communities, though to differing degrees. In Jetis there are five Integrated Health Service Unit (*Pos Pelayanan Terpadu* or Posyandu), which support the Community Health Centres (*Pusat Kesehatan Masyarakat* or Puskesmas). There is also a Village Resilience Organization (*Lembaga Ketahanan Masyarakat Desa* or LKMD), and a unit of the Family Welfare Education Organization (*Pembinaan Kesejahteraan Keluarga* or PKK), the latter running classes on health and environment, as well as rotating saving schemes for local women. Members of the PKK also manage the Posyandu. Finally, a unit of the Neighbourhood Youth Association (*Karang Taruna*) provides opportunities for young people to participate in sports and other leisure activities.

Given the proximity to the town and the abundance of means of transportation, village inhabitants have extremely easy access to all facilities and amenities available there.

Of the total number of inhabitants, 2,847 are active in the labour force. According to official records the largest percentage of these, (25.2 per cent) work in the construction industry (an exclusivly male occupation). The other large employment categories are those of public servants (22 per cent of the population) and industrial workers (20.7 per cent). In our small sample of fifteen households, seven had a member who worked in the factory; four were women. Again, these data reflect the proximity of the village to the urban centre, with which it shares many characteristics. A very common occupation for local people, especially women, is the running stalls that sell uncooked and cooked food, though this source of livelihood is ignored in official statistics. Migrant workers make regular use of these stalls for their daily needs, since they have limited access to cooking facilities and even less time for shopping, cooking and general housekeeping. Our research revealed that earnings from food stalls can vary between Rp5,000 and Rp15,000 per day, according to the scale of activities.

Only 5.5 per cent of the active population are farmers, while 8.6 per cent are agricultural labourers. Though clearly income for farmers depends on the size of the holding and types of crops grown, we were told that a farmer can obtain Rp300,000 from the rice of a field of 1, 3 square metre (*1 pathok*). The income of agricultural labourers was easier to estimate. Our informal interviews revealed that agricultural labourers earn between Rp3,000 and Rp3,500 for a working day which usually goes from very early morning until lunch time. Women's wages are slightly lower and their tasks different. They are responsible mostly for transplanting and weeding, while men are usually involved in land preparation; both men and women harvest.

Although official statistics on employment were not disaggregated by sex, our research and observations showed that both men and women are directly involved in productive tasks. Although women have always been engaged in agricultural work, both on their own farms and as paid labourers, employment opportunities have greatly expanded in two ways since industrialization. The establishment of factories has opened up to them jobs as factory workers, especially for younger, unmarried women while it has created a market for the sale of food stuffs, an activity in which older and married women are often engaged. Similarly, women take care of the rooms rented to migrant workers *(kost*). In this, however, they receive some help from husbands. For example, one of our informants stated that since opening a food-stall and renting rooms to workers she has much more work to do and her husband has to help. This all represents a very considerable contribution to the budget of the household, if not the main or even the only one.

In addition to their paid work, women are fully responsible for child care and for seeing to all chores involving cooking, washing and cleaning the house, with some occasional help from children and husbands. In a later section we will analyze the ways in which industrialization has brought changes to this pattern especially in relation to tasks connected with the use of water, fodder and fuel.

4.3.2 Combongan: a rural village

Combongan lies at 5 km to the west of the town (see Map 4). It has 17 hamlets (*Dukuh*) 6 Village Associations (*Rukun Kampung*) and 19 Neighbourhood Associations (*Rukun Tetangga*). There is a total of 4,062 people in the village, in 825 households. This gives a household size of 4.9 which is a little larger than in Jetis but not greatly so.

The first striking difference from Jetis appears in land use. In Combongan, of a total of 325 ha the greatest part (227 ha) remains devoted to farming activities. This represents nearly 70 per cent of the total land, compared with a little over 1 per cent for Jetis. The rest of the land is given over to housing (76 ha) and other uses (roads, public buildings etc). Most of the agricultural land is owned by local residents, though in some cases they may rent it out instead of working it themselves. Our survey showed that a much larger proportion of households than in Jetis owns rice land (73 per cent compared to 20 per cent) while all have a home-yard, used mostly for growing plants. Village statistics reveal that 75 per cent of farm land is owned by residents who work on it, while the rest is rented out. The local rental system is known as *oyod*; under this system the given plot is rented out for only one season and for cash (1 ha would cost about Rp1,000,000). Land ownership appears more skewed than in Jetis, with a few owners holding as much as 10 ha. Little of the village land has been sold to factories, another noticeable departure from the situation in Jetis.

In Combongan only 9.5 per cent of the people have finished primary education, while 5.6 per cent has completed secondary school. While about 20 per cent are still attending primary school and a total of 1 per cent has achieved higher education (university or specialized schools), over 50 per cent have either not attended primary school at all or have not managed to complete it. This is a very striking difference from the situation in Jetis, where only a small percentage of the population has such low educational attainments. This is clearly reflected in the distribution of the population according to employment. Unfortunately, for both Jetis and Combongan official statistics on education are not available by gender.

Unlike the case of Jetis, Combongan has very limited educational facilities: one kindergarten and three primary schools. Pupils attending higher educational institutions are forced to travel outside the village. This situation, and the relative distance from the town, explains to a great extent the difference in educational attainment found in the two localities. Other facilities crucial to the well-being of the community are also fewer in number. There are five mosques, one community health centre, eight midwives and/or nurses, but no private doctor or hospital. It should be added that, according to our research, the community health centre offers very unsatisfactory services; its surroundings are dirty and very poorly kept, and available only a few hours a day. However, according to local statistics, use of contraceptives is widespread here as well as in Jetis, as shown in Table 4.2.

Table 4. 2 Use of contraceptives in Combongan

Type of contraceptive	No. of acceptors

Type of contraceptive	No. of acceptors
Pill	122
IUD	113
Condom	2
Other	143

Source:

Similar caution to that needed for Jetis has to be used in looking at these data, especially since the number of IUD acceptors appears unrealistic and that the number using 'other methods' defies explanation.

Housing also reflects the rural nature of the village, when compared to Jetis. Of the 655 dwellings found here, 218 are made either entirely or partially of brick, while the remaining 437 have walls of either bamboo or wood and hence are less permanent in nature. Access to the nearby town and villages is relative easy for the local population, given the frequency of public transport. Private form of transportation also reveal a difference. In Combongan there are 165 bicycles but only 75 motorcycles, one private car, two minibuses and five trucks. Clearly, people rely on much simpler and more traditional means of transport than their counterparts in Jetis.

Though several of the usual community associations are to be found here too, the benefits they provide for the community appear limited because of their poor performance. For example, interviews showed that many sections of the Village Resilience Organization (LKMD) had many problems and thus were unable to function properly. In relation to the life of the community, it is important to note here that during group discussions and informal interviews people expressed the view that modern forms of employment, especially factory work, were the main cause of the gradual disappearance of traditional practices of mutual help (*gotong-royong*), for which people no longe had any time.

Work patterns are the feature where the two communities appear to differ most. In Combongan the largest employment category is that of farm worker, which employs 38.9 per cent of the active population. Another 12.5 per cent are self-employed farmers. This is not surprising, given what has been said about land use in the village. What is also to be expected is that only 3.8 per cent of the active population are employed in the public service and related occupations. The poor educational standards must preclude the population from obtaining such jobs. Another category is that of construction worker, which accounts for 7.3 per cent of the active population of the village. The most interesting aspect of the occupation configuration is that 36 per cent is accounted for by industrial workers. Clearly, the physical distance at which the factories are situated explains the limited impact industrialization has had on land use, but even so, it does not preclude the possibility of local inhabitants from seeking factory employment.

There are several elements which link together certain aspects of employment and patterns of education in mutual relationships. Poor educational standards prevent people from Combongan from obtaining the more prestigious public service accessible in fairly large numbers to people from Jetis. Such poor standards also explain the greater reliance that those from Combongan have on factory employment, since 36 per cent work in factories by comparison with 20.7 per cent in Jetis. The absence of educational facilities in Combongan may be a contributing factor in encouraging young people to enter factory work rather than to prolong their education (for which they would have to travel somewhere else). The reverse is true in Jetis, where easy access to schools may encourage the attainment of higher qualifications among local inhabitants. The possible long-term consequences of the situation in Combongan may proove very negative, since human resources are not being developed to make maximum use of new employment and earning opportunities. As a consequence, local people may become less and less able to compete with migrant workers for industrial jobs, and less and less qualified for other forms of employment.

Farming, as already said, remains an important determinant of income and of the life style of local people. Earnings for farm labourers as mentioned above, range between Rp3,000 and Rp3,500 per day, women usually receiving the lower rates. Food and drink are by the employer. There are often strong social bonds between land owners and labourers, strengthened by the renewal of work arrangements over several seasons. A demonstration of this and of the agrarian nature of the community is the persistence of a ritual lost in most other localities. After the harvest, the community performs a cleansing ceremony and a celebration involving a puppet performance (*pagelaran wayang*). It is intended not only as thanks-giving and as a request for divine protection, but also as an opportunity for mutual forgiveness among farmers. In the course of our research, we were told that farmers consider this an important ritual because of the frequent disputes which arise among them in connection with the distribution of irrigation water.

Unlike to the case of Jetis, there is no sign here that migrant workers are moving into the village and creating opportunities for earnings through the rental of rooms or the sale of food.

As in Jetis, women have always been responsible for maintenance of the household and the care of its members, and for the many tasks this entails. The changes in these responsibilities brought by factory work, especially in relation to the use of water, fodder and fuel, will be looked at below.

4.4 Industrialization and Natural Resources

In this section, the impacts of industrialization on the two villages will be distilled from available information, in general terms and more specifically in terms of the availability and use of the natural resources under consideration. Differences in the situations found in the two villages will also be highlighted. From the above sections, it is possible to state that these differences depend primarily on the fact that the factories are located in very close proximity to Jetis.

At the general level, it is clear that what characterizes Jetis is its urban nature, which is reflected in the facilities available to the population (for education and health, for instance) and in employment patterns. These characteristics must not be considered to be the direct outcome of the arrival and expansion of the textile factories; rather they are related to proximity to the town. Proximity has encouraged the firms to set up business in this locality and this, in turn, has deepened and intensified the characteristics associated with urbanization.

Certain other elements in this process, revealed by our research, can be attributed very directly to industrialization. People interviewed commented on the fact that improvements in roads, telephone lines, electricity supplies, and other communication are certainly to be attributed to the presence of the factories, as is the general improvement in the economic situation of most households. A recurrent comment from informants was how much busier the village had become since the arrival of the factories. This was seen to have the positive aspects often associated with it in Java (the term *ramai* in Indonesian refers to a place being bustling as well as exciting and entertaining).

But many negative aspects were also decried. For example, the noise from the production plants, especially from PT Sritex, was initially a severe problem, until most people became accustomed to it. Further more young people, teenagers, school children and school drop-outs tend to congregate around food-stalls and at street corners, even late at night. Noise, disturbances and fights are not uncommon. Alcohol is consumed in public in defiance of the law, and this leads to further problems. As one of the participants in the group discussion stated:

> *Anak-anak banyak bergaul dengan para remaja sampai malam, sehingga sampai di sekolah ngantuk; anak-anak juga sudah mengenal minum keras dan rokok*
> (children play with the young until late in the evening, so they are sleepy at school; also children are beginning to drink and smoke).

The presence and often the close coexistence of young men and women without their families leads to easier and unsupervized relationships. Pregnancies outside marriage are said to be frequent with, according to local inhabitants, a lowering of the moral tone of the community. Another common problem, often remarked on by informants, are tensions erupting from the great deal of traffic generated by the factories. Especially when shifts change, the flow of traffic is often interrupted by security guards halting it to allow cars registered to the factories or private cars to pull in or out. This leads not only to an increase in congestion but often to conflicts between the guards and drivers of public transport vehicles.

Combongan, on the other hand, remains intrinsically a rural village, in its agrarian structure and facilities. Employment structures have, it is true, been altered by the arrival of the factories, since many villagers obtain employment there. This must of necessity have some impact on the lives of individuals and their families, as will be shown below. However, there have not been many substantial social changes stemming from industrialization, either through the introduction of more and better public facilities, which remain poor or from dramatic alterations in the social fibre of the community. One of the few changes has already been mentioned: the disappearance of activities of mutual help either in private undertakings (the building of a house, for example) or in public ones (such as road repairs).

4.4.1 Water

Where the use of water, wood and the natural resources is concerned, considerable differences also exist. In Jetis the factories have created a serious problem in the form of water shortages and pollution. During our research local inhabitants often remarked on the fact that waste water from the factories has contaminated the river and that, for lack of better sanitary facilities, the river is also being polluted by human waste.

As in West Java, the water shortage is caused by the fact that the textile factories sink very deep wells to satisfy their own water needs. As most survey respondents reported, since the construction of the factories all wells have had to be dug deeper. Despite this, many households face regular water shortages, especially in the dry season. Several households have had to dig a second well. One respondent stated:

> *Ada kesulitan, karena jumlah air berkurang apalagi pada musim kemarau air sumur kering. Cara mengatasinya adalah dengan meminta air pada tetangga yang kebetulan sumurnya tidak kering*
> (There is a problem because the quantity of water is insufficient, especially in the dry season when the well is dry. I ask neighbours whose wells are not dry for water)

Many households in Jetis have, however, access to piped water, which is said to be preferable to that from any other source in term of both purity and easy access.

A shortage of water is also experienced by farmers, since the water previously available for irrigation is now being drawn by the factories. The disputes referred to above are an outcome of the increased problems of this nature. In the mid-1980s, soon after the arrival of the factories, the village experienced a serious problem with water pollution. Industrial waste water used to be discharged into streams, and the pollutants which found their way into the rivers used for irrigation purposes ended up in the wet rice-fields. This often caused loss of crops. After several protests by residents, the factories claimed to have built discharge facilities to deal with the polluted waste water. However, what later emerged was that the pollution was merely being diverted downstream, with the result that the Ngrukem River now carries heavy loads of pollutants. Before this, the river was used to bathe and wash animals by people in the area. This is no longer possible.

While some measures have been taken by the factories in relation to water pollution, nothing has been done to ameliorate the problem of scartown. In the West Java cases factories have established systems through which near by households can be supplied with water. The water provided is insufficient and unequally distributed, and the systems have given rise to new forms of social differentiation. But at least their installation demonstrates some sense of civic responsibility on the part of the companies, as well as the determination of those demanding such returns, officials or otherwise. In Solo, however, no such systems have been created. One reason may be that some local households have access to piped water and thus do not rely entirely on well water. However, it should also be said that early promises on the part of factory representatives to build sports facilities or to contribute financially to community development schemes, as it is customary, have remained totally unfulfilled. So far, neither the intervention of village officials nor direct requests by citizens has had any effect in this matter.

In Combongan private wells located in the individual *pekarangan* still represent the main source of water for local households. They may occasionally have to be dug deeper, according to how dry the season becomes, but in the main the water is said to remain sufficient for domestic needs and, since it is unpolluted, suitable to most household purposes.

4.3.2 Fodder

As stated in the discussion of the West Java cases, the availability of fodder can only be analyzed in the context of the presence of farm animals. In Jetis animal traction power in the fields has been largely replaced by motorized tractors. Our case studies showed that in the past water buffaloes essential for ploughing were the prized possession of several farming families. Several of the families interviewed had also owned cows. The disappearance of these animals is due to a number of reasons, listed by informants. The main and obvious one is that there is now little or no cultivated land on which to employ them. An other reason is that in a built-up area, the smell and noise of large animals in close proximity may represent a disturbance to neighbours and to oneself. Finally, children are said to be too busy with school work (again one should remember the comparatively high educational attainments in the community) and/or too unwilling to be relied on for the care of such animals, especially given the attractions of new forms of entertainment. An interesting comment made by one of the survey respondents was that children would refuse to look after the animals because they would 'be ashamed in front of outsiders'. All these reasons match the increasingly urban character of the village, economically, spatially and socially.

In both villages people still keep chickens, in numbers varying from three to 15, and mostly for personal consumption. They are fed on household scraps with the addition of bought feed. There are a few water buffaloes in Combongan as well as a few goats, reflecting the persistence of the agrarian nature of the village. These larger animals are fed mostly with the dried stalks of the rice plants readily available from the fields. In both locations the survey (especially through a number of qualitative, open questions included in the questionnaire) revealed that feeding animals is one of the spheres in which men have started playing a greater role since women have become more involved in factory work, in running a food stall or in renting out rooms.

4.4.3 Wood fuel

Use of wood as fuel represents another area of difference between the two villages. The great majority of the people of Jetis have shifted to the use of kerosene for cooking. Several reasons were given for this, the main one being that women are in the main engaged in a variety of paid jobs. In order to cut down the time spent in domestic tasks, they prefer to use kerosene, which allows them to complete other tasks (cleaning and washing) while cooking. Wood stoves, on the other hand, are said to necessitate constant supervision, for obvious reasons. In addition, they occupy much more space in the kitchen. Nearly all the survey respondents also claimed that one of the main reasons for the shift to kerosene was the disappearance of free sources of fuel. One respondent stated 'We used to get wood from the yard but now we have built rooms for rental on it'.

Similar reasons for preferring kerosene as domestic fuel were given by many of the women interviewed in Combongan. Despite this, in the latter location most people still use wood. The wood is mostly residual and is obtained from the *pekarangan*. Our survey and discussions showed that in addition to fruit (mainly banana), herbs, and flowering plants, many people grow shrubs and small trees from which they can obtain kindling. As already noted, most houses in Combongan are surrounded by a yard, unlike the case of Jetis where most yards are used additional rooms for rental or else have been sold to others for similar purposes. In Combongan wood is also available outside yards. As a respondent claimed: 'there are no difficulties with wood for cooking; there is plenty in the vicinity of the house'.

Given women's involvement in paid work in both villages, the research tried to ascertain the extent to which husbands contribute to domestic tasks. Most of those asked claimed that indeed they receive help from their spouses, especially with feeding animals, collecting water and general cleaning. It also appeared that help from husbands is much more common as in Jetis for women who cook and clean for commercial purposes (for example when they run a food-stall and rent accommodation to migrants) than for those who perform these tasks only for their own families. Indirectly, this could be taken to be a change brought about by industrialization. However, other informants felt that women's attempts to enlist their husbands' labour can at times result in domestic conflicts. To avoid this, some women prefer to seek the help of daughters and sisters rather than of husbands.

When considering the specific tasks associated with water from wells, both the small survey and the open discussions pointed to an interesting shift in both villages: the separate contribution made by husbands and wives to this work has increased, while that which they provid together has declined. It is possible to speculate tentatively that despite the availability of piped water, households still make use of wells for various domestic purposes. However, their separate involvement in factory and other types of formal employment force husband and wife to increase their individual, rather than joint, input into these tasks.

Children appear to help little in this sphere in both of the villages. Respondents said that it was difficult to claim their time when there were more attractive alternatives, such as watching TV and playing in the street. Others, who took part in the group discussion, expressed pity for their children, whose school work they considered already demanding. The same group of people agreed also that it is not longer acceptable to believe that a larger number of children means greater prosperity; on the contrary it is important to limit the number of children a family has. This, however, was not in any way an attitude that could be connected specifically to the advent of the factories.

4.5 Conclusions

The presence of factories has clearly had a noticeable impact on both communities. Proximity to both the town and the factories themselves has meant that the impact of industrialization on Jetis has been much more profound and widespread, by comparison with changes brought to Combongan. Jetis displays the characteristics of an urban community in all its aspects: from the type of housing and other facilities to means of transportation and emerging social problems. Combongan, on the other hand, remains much more firmly grounded in its rural and agrarian roots.

The changes which have been observed, especially the problems associated with the use of water, are very similar to those encountered in the West Java sites. As was expected, these changes (both positive and negative) are much more advanced in Jetis and Cintamulyathan in Cisempur and Combongan. This applies to changes to infrastructures and the economic nature of the village as well as to their social and cultural life.

One interesting difference between the two regions concerns the two villages further away from the factories, namely, Combongan and Cisempur. Despite the fact that they are situated at comparable distances from the industrial plants, Combongan has been spared many of the alterations which are effecting

Cisempur. Here the impacts of industrialization, though not as strong as in Cintamulya, are already visible and threaten to increase very rapidly. Combongan, on the other hand, has changed less. As noted in an earlier chapter, the integrated and complex nature of the agrarian system means that many of the features described above are interconnected, much as the reliance on agriculture for income, the local educational standards and access to alternative employment, the use of cattle and other domestic animals, the type of water-related problems, the use of fuel for domestic purposes. In most of these aspects, Combongan retains its original features, both positive and negative, for it is still much more dependent on its agricultural basis.

At the more specific level of industrial work, an interesting difference is that wages earned in West Java are higher than in this region. The obvious reason is that the Regional Minimum Wage in Central Java is, at Rp3,000 per day, lower than that which applies to West Java (Rp4,600 per day). As a consequence, employers are able to keep the general wage level below that in other regions. Another possible reason for this trend is that the area around Bandung has been industrialized for a longer time, and much more intensively. Workers, therefore, have become better informed about their rights, and more experienced in demanding them. In the preceding chapter, the point was raised that recruitment practices give preference to migrants and to female workers over local people and over men, at least in part to ensure a more docile labour force. While the argument remains valid, it is possible that overall the longer experience of industrialization allows workers to claim higher wages than in Central Java. A third possible explanation for the difference could be the fact the firms in West Java are mostly foreign-owned, while those located in this site represent domestic investment. Though it is not possible to offer proof of the fact that wages paid in the former are higher than in the latter, scattered evidence from various sectors points to this.

Another important difference between the West and the Central Java communities lies in the fact that in Jetis, unlike Cintamulya, factory owners are doing little to remedy the damage caused by their interferences with the environment. It is true to say that the problem of water scarcity appears much more acute in the West Java region, since in Central Java many people have access to piped supplies. All the same, no system has been put into place in the latter area by factory owners to compensate for the scarcity of water, while the earlier measures against pollution have only shifted the problem downstream. Furthermore, no form of compensation or contribution has ever been paid to the community. In both sets of communities the impact of industrialization on natural resources is a very charged political issue, but clearly in West Java more successful strategies have been adopted to tackle it. The fact that community associations are ineffective in Combogan may indicate that the village would be as poorly equipped to claim such compensations from the factories, once their impact is felt, as Jetis has been.

CHAPTER 5

CONCLUSIONS

5.1 Introduction

This chapter contains a summary of the main findings of the research and an analysis of their significance for the questions posed. For this reason it is useful to repeat in brief the main aims of the research. These concerned:

1. The impact that industrialization is having on the availability (in quality and quantity) of three main natural resources, namely, water, wood for fuel and fodder in the rural or peri-urban communities under study. Impact was considered to be either <u>direct</u> or <u>indirect</u>.

2. The adaptive strategies of households using such resources, and the implications of those for relations within households in terms of gender and generational allocation of responsibilities and tasks. An element of this is possible changes in the perceived value of children and hence in demographic behaviour.

3. The possible changes in formal and informal arrangements between local households in the management of common property resources.

The comparison between the two regions was methodologically invaluable because, although it revealed interesting differences (for example, in the ability of the local community to challenge the factories), it showed that patterns of change are very similar.

Thus it gave them greater value than reliance on a single and perhaps idiosyncratic example. Also revealing, for the purposes of the research, was the comparison between the two most urbanized and industrialised villages (Cintamulya and Jetis) on one hand, and those which were less so (Cisempur and Combongan) on the other. In the summaries and analyses which follow, both types of comparison will be highlighted.

5.2 Main Findings

As a general conclusion, it can be stated that the research showed that the rapid penetration and expansion of factory is having a considerable impact on the natural, economic and social characteristics of the two sets of communities, in both West and Central Java. This confirms what has been found to be the case in other parts of Java and in other regions of the country.

It was clear from the research, however, that these changes were not entirely new. Rather, they were part of processes of industrialization and urbanization which were well under way, especially in Cintamulya (West Java) and Jetis (Central Java), but which the recent advent of a fast and widespread industrial presence had reinforced and brought closer to these particular communities. Before the three research questions are addressed individually, a number of important points need to be made.

The central transformation for both regions is the widespread change in land use which accompanied, and indeed made possible, the establishment of the factories. That this is an outcome of industrial expansion is shown clearly by the difference between the villages closest to the factories and those further away. In Combongan (Central Java) and Cisempur (West Java) official figures showed that 70 per cent and 86 per cent of land respectively is still for agricultural purposes; in Jetis (Central Java) and Cintamulya (West Java) this has declined to 1 per cent and 19 per cent respectively. Similarly, a difference can be seen in the existence of home-yards. While we can assume that in the past most homes would have been surrounded by a yard, the survey showed that in West Java this is so in 83 per cent of the cases in Cisempur, but only in 45 per cent in Cintamulya. The integrated nature of agrarian systems needs to be referred to again here. This is because the shifts in land use, in various degrees, has had repercussions on all the aspects of the socio-economic and cultural lives of the communities which the research tried to analyze.

The impact of this on the separate natural resources will be discussed below. Here, the conclusion we draw from the research is that the change in land use from agricultural to industrial purposes may be strengthening existing forms of social inequality. Those who owned land are able to maintain their economic and social position by selling it and re-investing their profits either in land in other locations or in accommodation for rental to migrant workers. On the other hand, those who were landless but dependent on the earning opportunities which agriculture offered now find themselves deprived of their principal source of income (only 3.1 per cent of those interviewed in the two villages in West Java gave 'agricultural work' as their main occupation) but unable to benefit from the new employment opportunities in the factories. A manifestation of the same transformation is that occupational multiplicity, a strategy traditionally adopted to maximize household income security, has virtually disappeared; for example, in the two communities in West Java 92 per cent of our sample relied on only one source of income.

A second and related set of core findings concerns employment. Industrialization has undeniably brought new employment opportunities to the two regions under investigation. The research showed that over 60 per cent of those in the two West Java communities who are in paid work are factory workers, six out of every ten being women. But these opportunities are more available to certain social groups than others: younger people, women and migrants. Furthermore, they are not open to local people to the extent the latter (especially adult men) had expected or to an extent sufficient to counterbalance the social and environmental disruption brought to their lives. A question of perceptions should be raised here, for Cintamulya. Disregarding the reality of employment generation in the region, the community at large and adult men in particular shares a strong sense of not benefiting sufficiently from the job opportunities to which they believe themselves to have first claim. As described in the present report, this has lead to open conflict with the factories and contributes to the strained relations between community and factories.

In some of the villages (this was the case particularly for Combongan in Central Java), the sustainability of the gains brought by industrial employment is called into question by the relationship which exists between industrial work, education and public facilities. Poor educational facilities and the ready availability of factory work combine to discourage young people from seeking higher qualifications, and this reproduces their incapacity to seek better and more varied employment opportunities than those offered by manual jobs within the factories. For all the communities, the nature of the gains is also put into question by the conditions of work typical of the factories. The latter are often characterized by intense work at unsociable hours, with very brief rest periods, resulting in frequent accidents and perhaps long term damages to the physical and psychological health of the workers. Furthermore, the demands of shift work appear to be preventing people from participating in community-based activities, to the detriment of the social life of the villages.

A third set of core findings relates to the diverse nature of the impact that industrialization has had on the communities closest to the factories, when compared to those further away. The details given below show that , while, there are no exact patterns of problems and benefits, a few general aspects can be noted. One is that the villages closest to the factories have seen a more sustained and visible improvement in infrastructure, especially roads and transport in general. At the same time, at the level of direct impact on the natural environment and the social fabric of the communities, those closest to the factories suffer most (from air, noise and water pollution, scarcity of water and challenges to social norms). These impacts are visible and clearly felt by the community. The health implications of such a deterioration in all the four communities are certainly a concern voiced by local health officials, community leaders and citizens alike, a concern which, it is hoped, this research will encourage the relevant authorities to address urgently and comprehensively.

The communities further away are also experiencing profound changes, but they are less direct and less visible. This may render the communities less able to devise safeguards against such problems. In addition to this, local communities receive little and unequal compensation for the deterioration in their environment from the factories which are either causing the problems or exacerbating them. The disparities between the villages in their ability to claim socialized forms of compensation (water supplies, contributions to the cost of public facilities, etc.) may be reproducing existing patterns of differentiation between communities, additional to those emerging within each community.

Another element of this comparison is interesting. It would appear from the research that a larger percentage of the active population is engaged in industrial work in the villages furthest from the factories (Cisempur in West Java and Combongan in Central Java) than in those closer to them (Cintamulya and

Jetis). It can be speculated that for both regions there are several explanations:

a. Location: the location of the villages may make it easier for the inhabitants of those closer to transportation and urban centres (Cintamulya and Jetis) to have access to a broader variety of occupations than those offered by the factories;
b. Presence of migrants: the presence of migrants living in the community (in Cintamulya and Jetis) offers income opportunities, primarily from cooking for them and providing accommodation, which are not open to people in the other two sites (Cisempur and Combongan) which thus makes industrial work a more attractive alternative;
c. Education: for the Central Java cases there was a strong correlation between the educational facilities, educational qualifications and employment patterns of the two villages, and thus the reliance of one set of inhabitants (those from Combongan) on industrial work.

5.3 Questions Answered

As stated above, industrialization has brought considerable changes to the communities studied. It is now possible to give an outline of what such changes signify in terms of the specific questions set by the research.

5.2.1 Industrialization, water, wood fodder and fuel

The first question addressed the impact that industrialization is having on the availability (in quality and quantity) of three main natural resources: water, wood and fodder in the rural or peri-urban communities under study.

The most striking impact of industrialization is the deterioration in the quality and quantity of water available for household uses.

Most people in all the research locations, especially the two (Cintamulya in West Java and Jetis in Central Java) closest to the factories, have experienced a severe decline in the availability and quality of the water they need for domestic purposes. This has been a direct outcome of the activities of the factories, all of which extract large quantities of water for their own use through artesian wells, and most of which discharge untreated waste into surrounding water systems, including irrigated rice fields (this is particularly the case for the communities in Central Java).

The impact of industrialization on use of fodder has been mostly indirect. One mechanism for this has been the dramatic shifts in the use of rice land (for factories and related infrastructure) and home-yards (for accommodation, especially of migrants), as discussed above. As land changes from agricultural to industrial uses all components of an integrated agrarian system are affected. With the shrinking of agricultural land and the activities associated with it, traction animals become unnecessary while, smaller cattle, ruminants and poultry become more difficult and more expensive to house and feed. A second mechanism is the competing demand that regulated industrial work has on the energy and time of those who would normally care for such animals, especially given the shift work system. In West Java, it was found that the first mechanism was more powerful in Cintamulya where the shift to industrial use of land was almost complete, while in Cisempur the second of the two mechanisms was dominant since, although land has only partly been converted to industrial use, people (especially women and younger people) are involved in factory work to a considerable extent.

As far as domestic fuel is concerned, industrialization is reinforcing a transformation which predates the establishment of the industries, namely, the replacement of wood with kerosene. In all communities, this is again more because of indirect rather than direct causes. It is the demands on the time and energies of people (especially women, who find cooking with kerosene much less time-consuming) which are causing the change, as well as access to cash through paid employment. But shifts in land use play a part here too, since they render burning material for cooking less available. Conversely, the easy availability of wood can still encourage people to prefer it as domestic fuel. In those places (Cisempur in West Java and Combongan in Central Java) where land use remains such that fire-wood is still freely available (from forests, fields or home-yards) the move to kerosene is being held in check. For example, while in Cintamulya only 19 per cent of the households surveyed still burn wood, the proportion in Cisempur is a much higher 42 per cent. This situation may soon be altered in the latter community, where people have lost access to the nearby forest, now transformed into a protected reserve watched over by guards.

5.2.2 Household strategies

The second of the research questions enquired into the adaptive strategies that households using these natural resources have developed, and the implications for relations within households in terms of gender allocation of responsibilities and tasks. An element of this is the possible change in the perceived value of children and hence in demographic behaviour.

As a response to water shortages, most households have had to devise new strategies to satisfy their needs. For example, in the two West Java villages (taken together) 90 per cent of the households surveyed used wells before the construction of the factories. This has now decreased to 65 per cent with most of these people relying on a combination of sources. Others share public facilities, or 'borrow' from neighbours. Most, across the two regions, have had to lower their standards in terms of the quality of the water they use for bathing and other domestic uses. Attempts at obtaining services or at least compensation for this as well as other difficulties from the factories can also be perceived as a strategy to overcome shortages. In Cintamulya (West Java) access to factory-provided water has so far been skewed in favour of the neighbourhoods closest to the factories. In the four Neighbourhood Associations adjacent to the factories 91 per cent of the households receive some water from the factories, while beyond that the proportion is only 47 per cent. This can be seen as another form of social differentiation caused by industrialization. It was also obvious that this was another reason, together with insufficient employment generation, for the dissatisfaction expressed by the community with regard to perceived benefits from industrialization.

Claiming compensation and contributions from the factories is a strategy which goes beyond individual and household initiatives. Its success depends on a number of factors, the principal one being the political will and skills of concerned village authorities. Sharing the work of this research with non-government organizations and its findings with representatives of the government and of civil society may be seen as supporting this strategy.

As far as fodder is concerned, the response to the changes brought by industrialization has been a generalized decline in the number and types of domestic animals, as described above. Though the long-term impact of this decline on the health and wellbeing of local inhabitants was outside the scope of this research, it can be speculated that it cannot be entirely positive, since people now have less direct access to the proteins and the additional earnings that such animals and their produce (eggs, milk and meat) could give. The decrease in the number of households which have and use their home-yards must be of particular concern, since it is commonly known that they can provide supplementary cash and consumables (fruits, herbs and vegetables) as well as enhance the immediate physical environment.

Finally, the adaptive strategies of households in relation to the use of fuel have already been discussed above, together with their reasons. In this case the change may be seen as positive, since cooking with wood is tiring, time-consuming and threatening to the health of those who are responsible for it (inhalation of fumes causes many respiratory troubles). Wood, however has the advantage of being free and, for some informants, of giving a more agreeable flavour to the food.

It is important to look at these adaptive strategies in a more disaggregated manner, that is, at the distribution of tasks within households. In all four villages, the research found that with fast and widespread industrialization women, or to be more precise wives, remain responsible for many of the tasks connected with the use of water, fuel and fodder more often than their husbands. The contribution of husbands hasin fact often declined. This, however, has to be considered in the light of other factors:

– the work (in time, effort, and distance covered) related to collecting and using each of the resources has decreased, with the exception of that which relates to water, for which a generalization across the four communities cannot be made;
– other members of the family, and especially sons, give considerable help in carrying out these tasks;
– women feel that husbands help more with all domestic tasks, whether directly linked to the use of natural resources or not, when wives are visibly engaged in making best use of the opportunities offered by industrialization (that is, when they are employed as factory workers or earning income through renting rooms to migrants).

When the questions for this research wew set out, the point was made that there is a tendency to believe that deterioration in environmental conditions always has more severe effects on women than on any other social group. This is based on the assumption that women universally have a ’special’ bond with nature because of their biological capacity to reproduce and that gender relations, especially within household units, are rigid. The findings of the research allow us to address these assumptions.

The first comment to be made here is that the findings of the research summarized so far point to the fact that environmental deterioration results in a more complex picture than unmitigated negative consequences for women. It is true that women continue to carry out tasks connected with the use of natural resources to a greater extent than men and that, in fact, men's contribution to such tasks has declined. However, the adoption of certain strategies is not a function of an innate bond of women with 'nature', but rather stems from the combination of very specific conditions. For example, the degree to which women in the four communities have shifted from wood to kerosene, far from being a demonstration of women's concern for 'nature', is the outcome of the desire and need to combine cooking with other household tasks and with paid work. It is also a response to improvements in supply (of kerosene, in itself an outcome of urbanization) to the and increased availability of cash (especially from employment in the factories) as well as to local availability of wood.

In addition, the research showed that in Java gender norms are not inflexible. Their flexibility is shown by the fact that it has been relatively easy for women to step out of the household domain to make maximum use of earning opportunities in the industrial sector. Of importance here is the fact that earnings from factory work are, for women, higher than from any other form of employment. The only resistance that they encounter here is, ironically, that of employers, who give preference to younger, unmarried women over married ones.

Finally, the research found that across the four communities the help of children was still considered valuable. The comment was often heard that this was especially so when women were working in factories on the morning shift (a time when domestic tasks are normally taken care of). At the same time it was found that this did not alter parents' perceptions of the problems associated with having large families, because of the costs and responsibilities involved in raising many children, and because of the new moral hazards of the social environment. Local data on contraceptive use (not entirely reliable) and other information show that family planning strategies of different types are common. While it can be said that the help children give to busy mothers does not appear to affect the desire for small families, the child-care problems that inflexible work routines (and employers unsympathetic to mothers) create do not deter women from having children. Couples develop their own strategies: the help of grandmothers and neighbours is enlisted and husbands adjust their own work schedules in order to share in the care of children.

5.2.3 Common resources management

The possible changes in formal and informal arrangements among local households in the management of common property resources were also objects of research.

Two interesting issues emerged for West Java. One is related to water. The most important commonly managed source of water (though located on privately owned land) is a spring situated in the vicinity of the village of Cisempur. In the past, much more informal arrangements were sufficient to manage the resource. In recent years water problems have lead to an increase in the numbers of people using the spring (either directly or through piped connections). It has now become apparent that the previous informal arrangements will no longer be adequate to ensure that both the quality and quantity of the resource is maintained. Though solutions had not been found at the time of the research, the fact that this had become one of the core issues in the campaign for the election of the new village head, shows that a much more formal management system was being sought. This is clearly an example of a situation where the regulation of access to a common property resource is rendered necessary by an exogenous factor (industrialization and its consequences) rather than by the inherent weakness of the existing system or by abuses on the part of 'free riders'.

Changes have also occurred to another important resource near Cisempur, that of the forest. Here the state has intervened to stem what it perceived as excessive exploitation of the forest by taking the land under its ownership and control. The first point to be noted here is that the forest land acquired by the state was privately, rather than commonly, owned. The second is that this represents the loss of an important source of wood (including bamboo for building and other purposes), dry crops, medicinal plants, water (several springs are located in the forest), fodder and pasture for animals and space for leisure activities, just at a time when industrialization is creating shortages of all these natural goods. In other parts of Java similar situations have resulted in open conflict between guards and local people. Perhaps the possibility of social forestry programmes should be considered here before the situation reaches this extreme.

In conclusion the research has confirmed what has become apparent in other locations, that is, taht the communities studied derive considerable benefits from industrialization: infrastructure has improved while employment and income is more readily available . But these are not unmitigated benefits. They come accompanied by the much less appealing and more acute consequences of industrialization and urbanization: deterioration of the natural environment, new social stresses and inequalities and threats to the long-term cohesiveness of the communities and the personal well-being of their inhabitants.

The communities themselves are well aware of the situation and are seeking ways to maximize the gains and contain or eliminate the problems. In presenting these findings the intention is to offer to all those involved information through which it will be possible to work towards these aims.

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ABOUT THE AUTHOR

Dr. Ines Alessandra Smyth is Gender Advisor with Oxfam, where she works on the formulation of policies on gender issues and on stimulating research, training and advocacy in relevant fields.

She has a Ph.D. from University College London. Her areas of expertise are gender theory, gender and institutions, industrialization in developing countries and productive rights. She has been a lecturer at the Institute of Social Studies (The Hague) and at the Development Studies Institute of the London School of Economics. She was the principal researcher of an ODA funded research project 'Industrialization, Natural Resources, and Household Adaptive Strategies in Java, Indonesia' and is collaborating in a number of other research projects. She also carries out short-term consultancies for governmental and non-governmental bodies.

She has published widely; her most recent publications include the edited volumes *Different Women, Different Work: Gender and Industrialization in Indonesia* (with M. Gryins, A. van Velzen, P. Sayogyo, and S. Machfud, 1994), *Health Care in Java Past and Present* (with P. Boomgaard and R. Sciortino, 1996); and *Searching for Security: The Impact on Women of Economic Transformations* (with Isa Baud, 1997).