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Measuring the impact of Chinese provincial CDM Centres for local market development

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I. Introduction

Capacity building for the environment (CBE) has been an issue for development cooperation since the UNCED in 1992. With regard to climate change, GEF and UNDP have initiated the Capacity Building Initiative, and many donor organisations have been providing support for the set up of national Designated National Authorities (DNAs). Experiences have been gathered about institutional capacity building for climate protection at the national level, but measures to extent countries' capacities for climate governance to the sub-national level have started only recently.

Even if China has a large potential for CDM, capacity for development and implementation of CDM projects at the sub-national level was hardly existent when the Kyoto Protocol came into force in 2005. To tap the huge potential of CDM projects, especially in China's Western region, Annex I governments, international development organisations and the Chinese central government have launched several capacity building programmes to enable public and private actors on the local level to participate in the international carbon market. The most prominent approach is to set up so called "Provincial CDM Centres" as institution for the facilitation of provincial markets for CDM projects. These provincial CDM centres differ in their effectiveness as currently only eleven out of the twenty-seven existing or planned CDM centres have generated CDM projects which made it into the international CDM pipeline (UNEP Risoe October 2007).

The aim of this paper is to use the empirical case study on the establishment of provincial CDM Centres in China to inquire into the following research question:
What impacts have the CDM Centres on the CDM market development in their province?

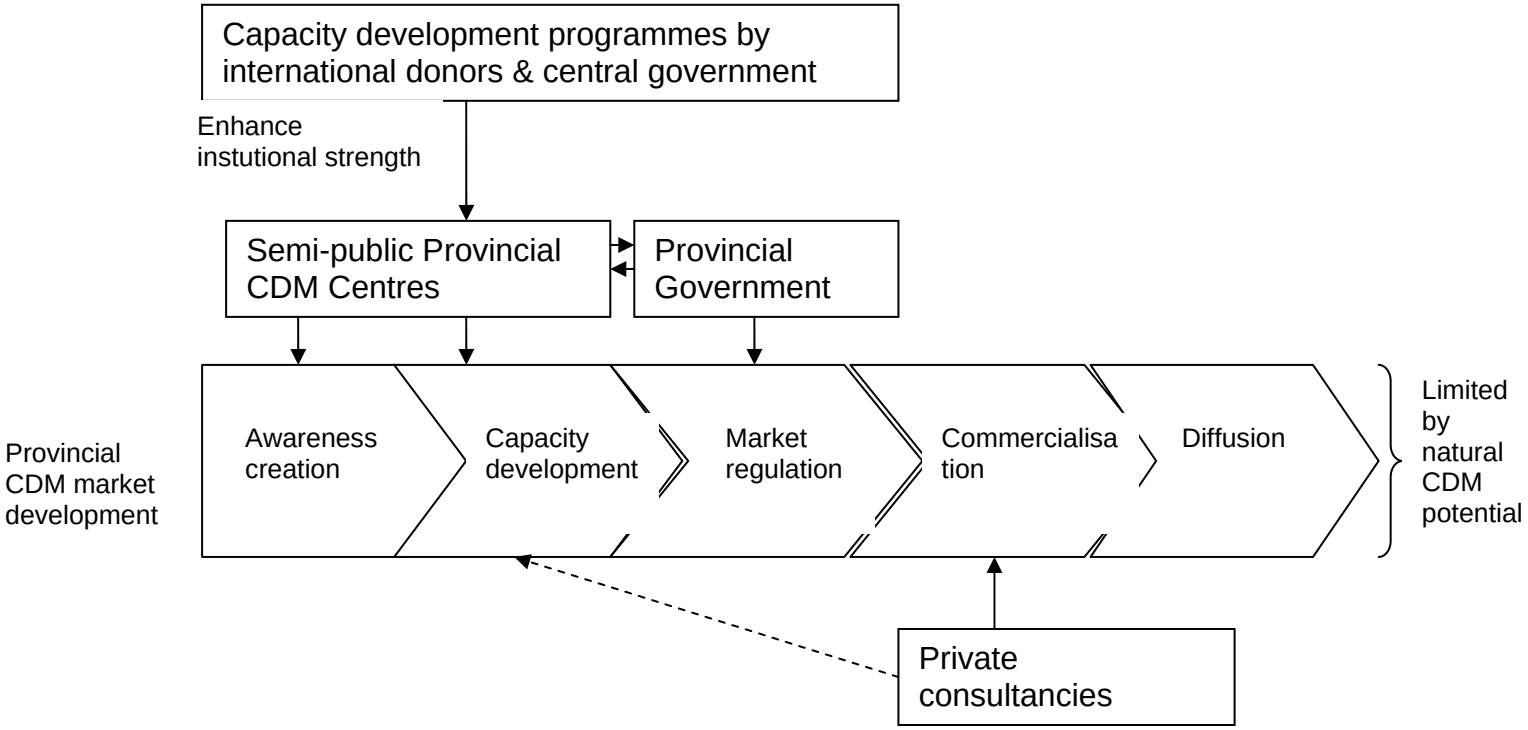
The paper starts with a summary of the conceptual approach used in this study for measuring and assessing impact of institutions on market development. The empirical part introduces briefly the situation of the Chinese CDM market at the national and provincial level and gives an overview about donors' capacity development projects for the CDM (CD4CDM) at the provincial level. The main part analyses the activities of four CDM Centres for their impact on provincial CDM market development. Special attention will be given to the methodological issues of measuring impact of market intervention activities. The paper closes with a discussion of the experiences made in China and their transferability to other countries in need for CDM capacity development.

II. Conceptual framework

1. Facilitating markets

Similar as newly invented technologies, one can perceive "certified emission reductions" (CERs) to be a newly politically invented good. Thus, in analogy to technology innovation, one can perceive the market development for CERs to go through similar stages of awareness creation, capacity building, market regulation, commercialisation and product diversification (Rogers 1995; Carbon Trust 2003). For initiating and steering new markets, so-called market facilitation institutions like the Provincial CDM Centres can become crucial catalysts. They can help to overcome an emerging market's shortcomings such as lack of information, networks, finance and technical know-how. These institutions are successful when they decrease the risk of engagement for market participants. Once risks of market engagement have become limited, private actors will become the driving forces of further market progress. Three fundamental dimensions shape the corridor for market development: 1. the timing of the intervention; 2. the choice of instruments; and 3. the interplay between public and private actors for market facilitation.

Figure 1: Phases of market development



Source: Adaptation from Carbon Trust 2003:18

Concerning the time of intervention, CDM Centres differ in their time of establishment. The first Centre had been initiated in 2004 and some are still in the planning stage. Similarly, the national Chinese CDM market started around 2005, but provinces show differences in timings in their local market start and market development pace. Assessing the impact of a centre on different market phases has thus to consider at what point of time – in which market phase – the centre started its operation. Even if market phases overlap in reality, a centre that started late, e.g. at a time when local CDM capacity was already well developed, cannot have the same impact on early market phases than centres that were established early.

Concerning the choice of instruments, one can distinguish between direct market support instruments, which target business actors directly; and indirect market support instruments, which create a favourable environment (Lewis/ Wiser 2007:1851). An appropriate choice of instruments depends on the present market phase, and on the ability and mandate of actors to use certain intervention instruments. For example, in the Chinese case study, the semi-governmental CDM Centre have a no mandate for direct market regulation, but can influence the provincial government by policy advice indirectly on market regulation. Thus it can be assumed that CDM Centres will mainly rely on indirect intervention instruments.

Concerning the interplay between public and private actors for market intervention, the paper follows the assumption of innovation theory that public actors are needed to initiate a new market, to raise awareness, provide capacity development and set up a functioning market regulation, while it is mainly private actors that eventually bring the market to phases of commercialisation and diffusion by their business operations (Carbon Trust 2003). Ultimately, the scope of market development is limited by a province's CDM potential, which is determined by its natural resources and its industry structure. Small geographical regions like Ningxia can be considered having a well-developed CDM market even if they have only a small number of CDM projects because they are either small in size or do not have a good CDM potential.

2. Measuring impacts

For measuring the impact of intervention programmes on market development, Martinot (1998:3) distinguishes between three types of indicators:
1. Market intervention indicators, which measure most direct impacts of a project's outputs.
2. Market development indicators, which account for indirect impacts of a project's outcomes. Impact of outcomes, however, might only be observable after the project completion and beyond.
3. Market sustainability indicators, which reflect the degree to which a developing market is sustainable without further intervention. Phenomena of these indicators are probably observable after a market has reached maturity.

Taking into consideration the limited amount of time that has passed since the establishment of the CDM centres (between 2004-07); this paper uses market intervention indicators and tries to use market development indicators where feasible. Since the CDM market – globally, nationally, and locally – is still in great flux and suffers from political uncertainty, inquiring into market sustainability would be premature. The hypotheses displayed in the following table were selected in order to measure the impact of the CDM Centres on the different phases of provincial CDM market development.

Table 1: Impacts of CDM Centres on different phases of market development

Phase of market development	**1. Awareness creation**
Hypothesis 1	*The CDM Centre have a direct impact on overcoming an information deficit, so that an increased awareness about the CDM is reached among potential project owners, government officials and financial institutions.*

Outputs	Information dissemination activities such as conferences, media publications, and propaganda.
Outcome	Potential project owners, governmental officials, and financial institutions have heard about the possibility of turning energy-related projects into CDM projects.
Phase of market development	**2.Capacity development**
Hypothesis 2	*The CDM Centre can have a direct impact on overcoming a lack of CDM capacity, so that CDM experts in the province increase in numbers and in their ability to develop successful CDM projects.*
Outputs	Capacity development activities such as trainings and publication of CDM handbooks
Outcomes	Project owners know about the CDM requirements, the registration process and can access whether their project is CDM eligible. Project developers emerge and have sufficient qualification to develop CDM projects according to international requirements. Possible variance in no. of experts and their CDM capacity (on a scale from low "project scouting and application of easy CDM methodologies" to high "development of own methodologies for complicated CDM project types; successful interaction with international buyers)
Phase of market development	**3.Market regulation**
Hypothesis	*The CDM Centre can have an indirect impact on overcoming a missing CDM institutional structure, so that CDM-related policies and market incentives are introduced.*
Outputs	Policy advice for the provincial government
Outcomes	Government officials ratify CDM-related regulations and market incentives, e.g. general political support statements, tax cuts, codes and standards.
Phase of market development	**4. Market commercialisation**
Hypothesis	*The CDM Centre can have an indirect impact on market commercialisation, so that the CDM becomes common practice in the province.*
Outputs	Development of PDDs, lobbying with project owners, government officials and financial institutions
Outcomes	Majority of project owners uses CDM financing if appropriate, increase of no. of PDDs and volume of CERs. No. of PDDs in province has increased and CDM projects show high quality (e.g. all PDDs developed become approved by EB). Additionality of projects becomes questionable. CDM has become part of long-term political policies/planning. CER revenues have become a common security for loans.
Phase of market development	**5. Market diversification**
Hypothesis	*The CDM Centre can have an indirect impact on market diversification of the CDM market, so that the market diversifies in terms of product (= type of CDM/VER project), producers (=project developers) and consumers (=buyers).*
Outputs	Provision of information and technical assistance is provided for applying new types of CDM projects. Research on new methodologies. Initiation of intra-provincial market cooperation.

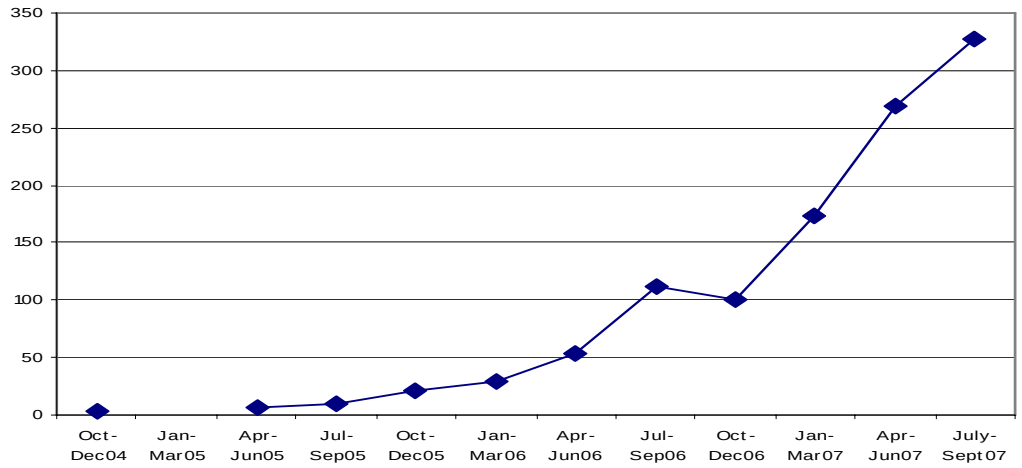
Outcomes	New “CDM products” such as new methodologies or VERs, Gold Standard CDM, and MDG CDM projects types appear on the market. Diversification in no. and specialisation of CDM consultancies; diversification of seller and purchaser demographics.

III. Case study China: Capacity development programmes for CDM market development

1. Overview on CDM market in China

Despite its large potential, China had taken a slow start in the global CDM market when the Kyoto Protocol came into force in February 2005 (Zhang 2006:6). After several CDM capacity development programmes had assisted China to set up its institutional CDM structure and after positive CDM project examples from other countries had raised China’s awareness of its own CDM potential, the country quickly caught up (compare graph 1) and soon became one of the top CDM host countries.

Graph 1: New CDM projects developed per quarter 2004-2007



Source: Based on UNEP Risoe October 2007

The CDM market in China has the following characteristics: 1. It is a politically created market by the parties to the Kyoto Protocol; 2. Political market regulation by the international state community, but especially by the Chinese government, were still in flux in 2005. Now, national CDM regulation in China has reached predictability. 3. The tradable “Certified Emission Reductions” (CERs) - and also “Voluntary Emission Reductions” (VERs) - are newly created commodities, on which potential market participants had neither knowledge nor trust in the beginning; 4. A high and increasing demand exists on the market from Annex I countries and companies for CERs; 5. Most of China’s provinces have a high potential for CDM project; 6. Political support by the Chinese central government existed for the CDM and its envisaged global effects such as emission reduction and local effects such as increased foreign investment into clean energy infrastructure, technology transfer and benefits for the local environment or even sustainable development.

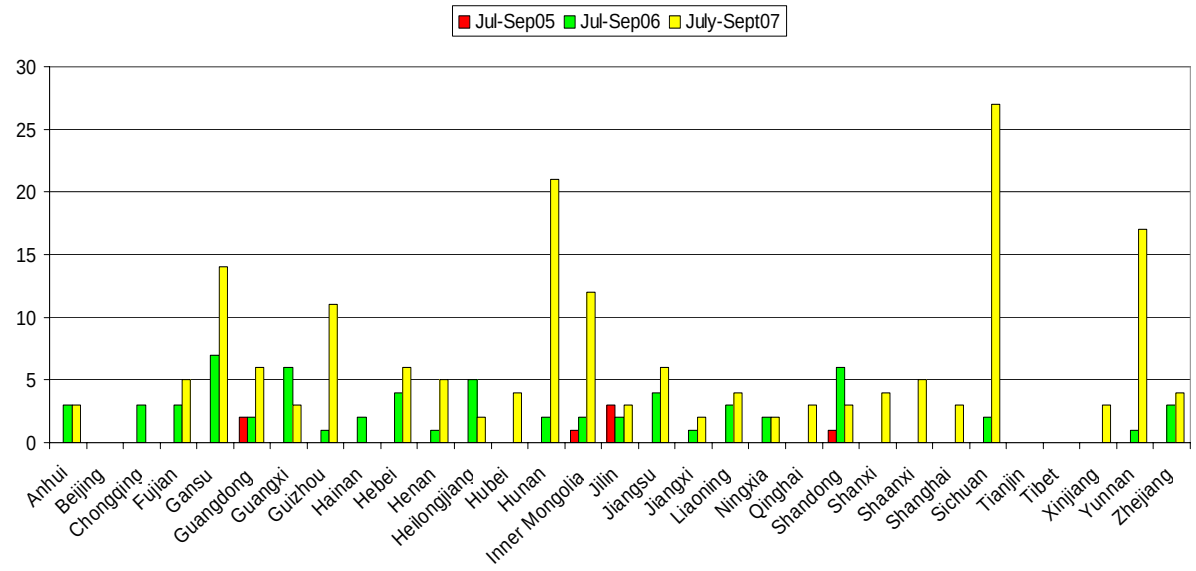
Despite such favourable framework conditions, there are still barriers at the national level for CDM project development that relate to general investment barriers in China

like the strong governmental intervention in the economy, inflated bureaucracy, and an insufficient protection of intellectual property (Bfai 2007); and CDM-specific barriers like the 51% ownership rule which requires Chinese companies to hold a 51% control on CDM projects, thus limiting foreign companies' influence, and the set floor prices by the Chinese government (Gao/Li 2007).

2. Provincial bottlenecks

The CDM market in China's provinces has developed at different pace. Despite their good energy resource allocation, Western provinces took a slow start in the CDM market. Instead, a correlation between provinces with high FDI like Shandong and Guangdong and early market entry can be observed (see Graph 2).

Graph 2: Changes in CDM project development per Chinese province (2005-2007)



Source: Adapted from UNEP Risoe October 2007

Western provinces have caught up in 2007 at least in terms of numbers of CDM projects, although in terms of CERs generated large HFC and N_2O projects at the Eastern coast still account for a geographical gap. CDM markets tend to face a number of barriers (OECD 2007), some of which were also listed by interviewees of this study. These were for example: a lack of CDM awareness among potential project owners, government officials and financial institutions, a lack of capacity to develop complex CDM projects and a lack of capacity to actively participate in the international carbon market (e.g. lack of foreign language skills, experience to deal with foreign companies, lack of contacts).

3. Overview of donor programmes for provincial CDM capacity development

Once the CDM market came to life with the coming into force of the Kyoto Protocol in 2005, governments of Annex I-countries started to get involved into provincial CD4CDM programmes in China. The foci of their programmes vary broadly (see table 2 and map 1 for an overview).

Table 2: Overview of selected donor programmes for CD4CDM at the provincial level in China

Donor	Location	Time	Objective	Activities
Sino-Canada Cooperation Pilot Project Local CDM Capacity Building	Ningxia	2003-2005	Exploration of twelve potential CDM projects and development of 3 PDDs	Financial support for Ningxia CDM Centre, trainings for local project owners and experts
ADB: Opportunities for the CDM in the Energy Sector	Gansu, Guangxi	2004-2005	Small-scale CDM project development	Assessment of potential for small-scale CDM projects + trainings
China-France CDM Capacity Building Cooperation Programme	Guangxi, Sichuan, Guizhou and Yunnan	2006-2008	Promote bilateral cooperation in clean technology, development of CDM projects	Financial support for 4 CDM Centres, trainings
Development of Sino-Italian CDM Projects	Ningxia	2006	Development of 3 CDM projects	PDD development
China-Canada CDM Capacity Building	Hebei, Shanxi, Zhejiang, Shandong and Hunan	Five months in 2007	Exploration of potential CDM projects and development of PDDs	Financial support for CDM Centres, trainings for local project owners and experts
China-Japan Shandong CDM Capacity Building Programme	Shandong	2007 – 2008	Development of CDM projects	Financial support for Shandong CDM Centre, trainings for local project owners and experts
China-UNDP “Millennium Development Goals (MDGs) ”	Liaoning, Jilin, Inner Mongolia, Xinjiang, Hubei, Henan, Anhui, Jiangsu, Shannxi, Qinghai, Shanxi and Xinjiang	Launch at end of 2007	Development of CDM projects in Western provinces which have a measurable contribution to the MDGs	Trainings for 12 provincial CDM Centres, maybe set up of carbon exchange platform between sellers and buyers

Map 1: Selection of Sino-foreign CD4CDM projects at the provincial level

The first foreign donor programme which focused on capacity development at the provincial level was a Sino-Canadian project, which supported the set up of China's first provincial-level CDM Centre in the Ningxia Autonomous Region. Due to the success of the project, Canada expanded this project to four other provinces, and other Annex I countries followed swiftly in picking up provincial level CD4CDM programme in China.

The donors approach for provincial CD4CDM is very similar and thus it turned out that comparing them for different programme designs is neither interesting nor feasible as they are implemented via the Ministry of Science and Technology (MOST). In general their main goal is to develop short and long lists of possible CDM projects from the respective provinces, and to write PINs and PDDs. They are also granted the "first right of purchase" within a limited time for the CERs generated by projects from "their" provinces. The typical project for the support of provincial CDM Centres includes trainings for the centre's staff, but mainly trainings organised by the centre for provincial project owners and government officials. Staff and experts from Beijing source projects and write PINs and PDDs. In addition, CDM information is disseminated by CDM handbooks for the trainees, a launch of a CDM Centre's website, and sometimes articles in local newspapers or documentaries on local TV channels.

4. Analysis of CDM Centres' impact on market development

In order to determine the driving factors for provincial CDM market development and the role of the Provincial CDM Centres, the study uses a comparative case study design. Four provinces have been selected as case studies based on the relative performance of their CDM Centre compared to private consultancies. The relative performance of the CDM Centres is measured in no. of CDM project development versus total no. of projects developed in province, taking their activity in PDD development as a proxy for their institutional strength (see table 3). At the same time, provincial markets are selected which have shown a considerable growth in their market between 2005 and 2007.

Table 3: Development of CDM projects by CDM centres

Province	Total no. of CDM projects	No. Developed by CDM Centre	Percentage
Ningxia	9	8	88%
Hunan	62	27	41%
Gansu	57	5	8%
Yunnan	80	1	0.01%

Source: Based on UNEP Risoe October 2007

The first challenge in assessing the impact of the CDM Centres on provincial market development is the lack of baseline data on CDM awareness and capacity among market participants. This problem was tackled by two methods: Firstly, the available data from the UNDP Risoe Centre CDM pipeline was used to create a timeline for each provincial market (see section 4.4); and secondly, qualitative interviews were conducted with 64 representatives of donor countries and organisations, the Chinese central and provincial governments, the CDM centres, Beijing-based project developers and buyers, DOEs, and provincial project owners, developers, NGOs and researchers (see references). Interviews at the provincial level included a quantitative part which asked market participants to assess their peers' CDM awareness respectively CDM project development capacity for the time prior to donors' CD4CDM projects and for end of 2007 (see section 4.1). For an orientation, the following table 4 gives an overview about the four CDM centres' activities.

Table 4: Overview of activities by CDM centres

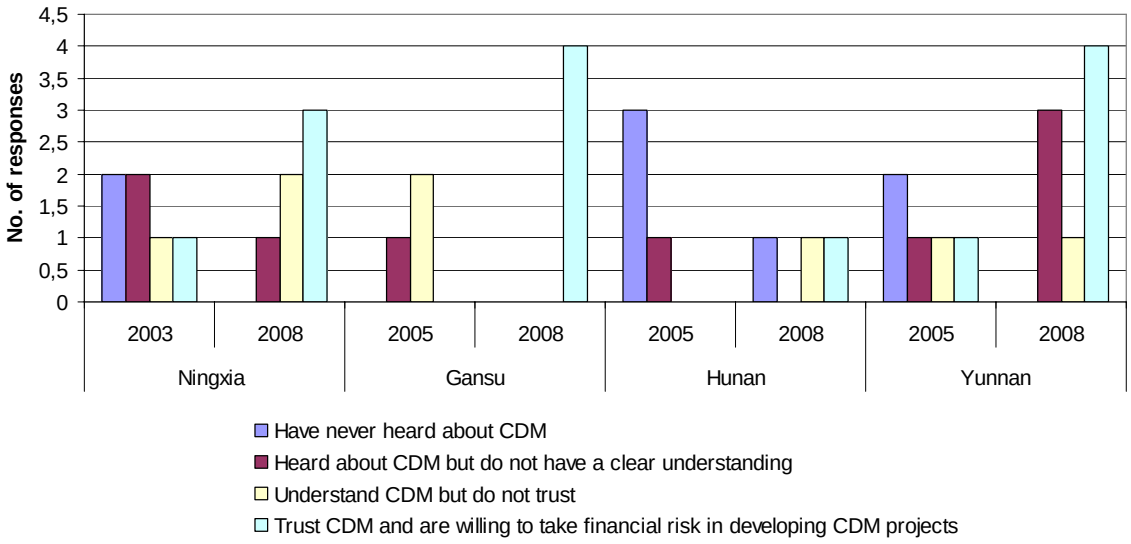
	Ningxia	**Gansu**	**Hunan**	**Yunnan**
Established in	October 2003	October 2005	November 2005	January 2007
Staff	15	8	19	12
Website	2006	2006	2006	-
Publications	CDM handbook; 16 articles between May 05 – June06	CDM handbook	CDM handbook	CDM handbook
Trainings/conferences	6	9	9	3
International cooperation	Canada, UK, Italy, Japan	ADB	Canada	France
Policy advice	yes	Yes	Yes	yes
Other			Software for calculating emission reductions; QQ online CDM advisory	

4.1. CDM awareness creation

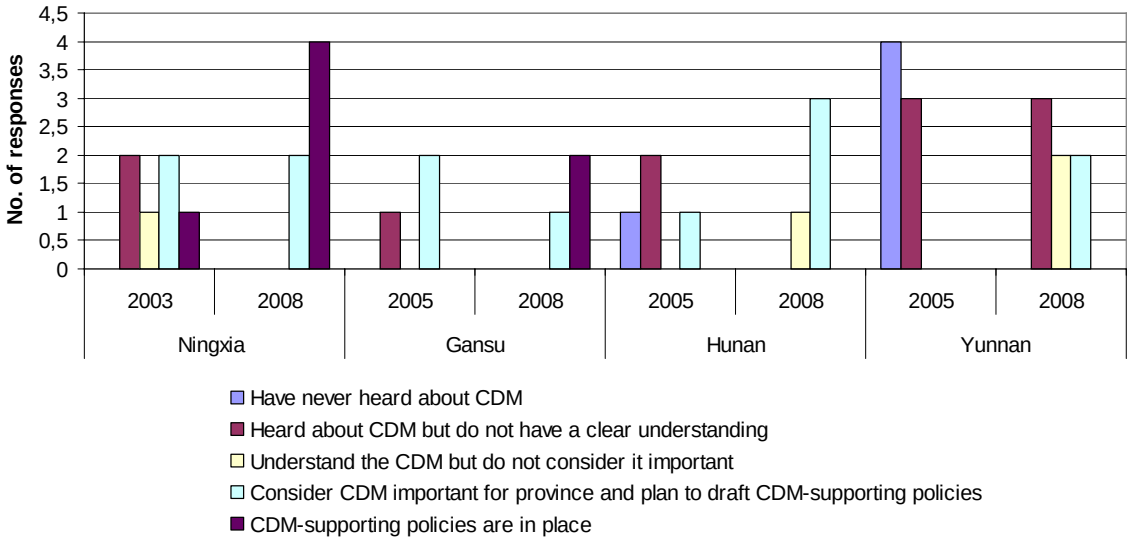
The earlier a CDM centre started operating in a market, the higher were its chances to have an impact on CDM awareness creation. As pointed out already, the methods of awareness creation used by the CDM Centres are very similar, but differ in their timing and scope. All CDM Centres are involved in organising provincial CDM conferences for spreading CDM awareness among local political leaders, industry and media representatives, and all have published basic information material on the CDM.

Using the method of peer assessment, an increase in CDM awareness was attested by the interviewees for the three groups inquired about a) potential project owners (see graph 3), b) government officials (see graph 4) and c) financial institutions (see graph 5). This increase in CDM awareness was given in all four provinces, but it varied in time and depth.

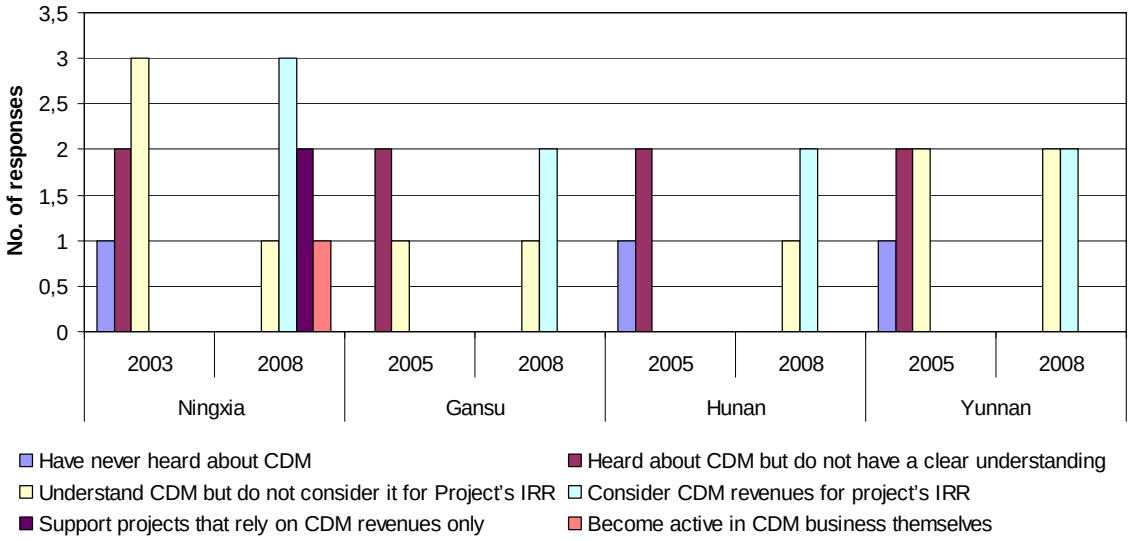
Graph 3: Change in CDM awareness among potential project owners



Graph 4: Change in CDM awareness among government officials



Graph 5: Change in CDM awareness among financial institutions



These quantitative results seem to testify that there is at least a correlation between the CDM Centres' information dissemination activities and the increase of CDM awareness among market participants. However, these generalisations have also to be taken as a tendency only because of the small n of the sample.

The qualitative parts of the interviews shed some light on possible underlying causal connections. The following explanations were given by the interviewed market participants and by experts such as researchers for the impact of the provincial CDM Centres on CDM awareness rising:

- In the case of Ningxia, and to some extent also in Gansu, they simply were the first to approach project owners with CDM information.
- They are perceived as especially trustworthy, because they are attached to the provincial government (points raised in Ningxia, Gansu and Hunan). A governmental background makes them trustworthy, because "they will not just disappear tomorrow" and "they do not just want to make money".
- This situation is seen differently in Yunnan, where the majority of project owners rely on private consultancies for CDM-related information. Reasons given were: Information offered by private (mainly Beijing-based) consultancies was a) qualitatively better than the information provided by the CDM centre, and was b) provided at an earlier stage. Departments of the provincial government did operate without coordination, not well-informed and inefficiently.
- Concerning the use of the CDM publications of the CDM Centres, interviewees had received publications only when they participated in the Centres' trainings. Websites of the centres are known, but the provincial market participants stated that they mainly use the websites of the Chinese DNA and of the UNFCCC as information sources, because these provide consolidated information.

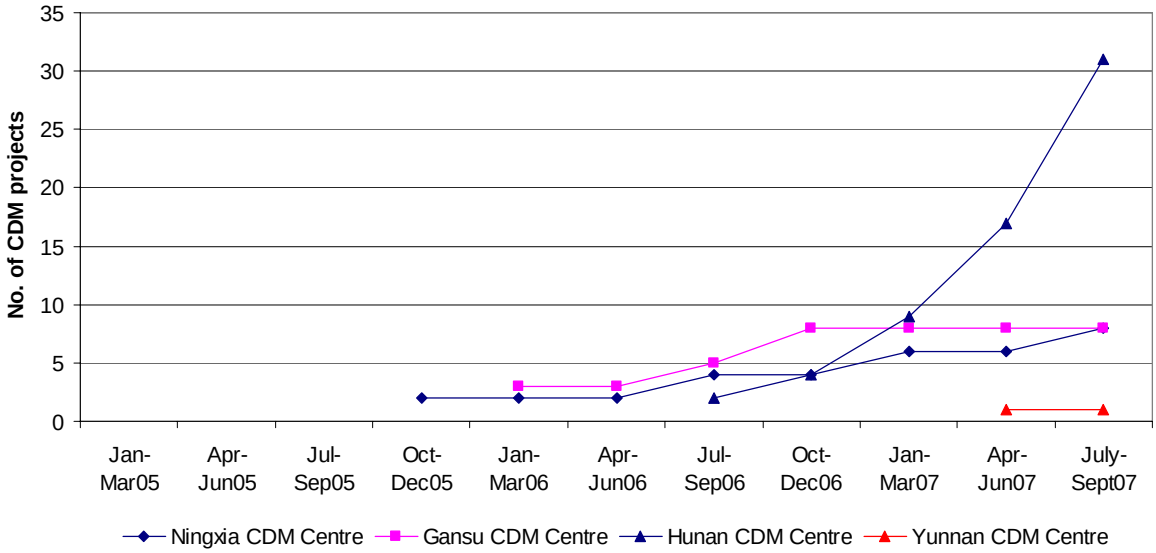
Alternative explanations for an increase in CDM awareness in the four provinces were the activities of industry associations and the headquarters of the project owners, which also provided their members and sub-branches with CDM information. For example, a Ningxia branch of one of China's five big power producing companies received CDM information and trainings organised by his headquarter. Hydro power industry associations are also active in providing CDM information to their members, trainings are not hold, but members exchange information about project developers and their successfully developed CDM projects informally.

4.2. CDM capacity development

All CDM Centres organise provincial CDM trainings, but these differ in frequency and scope. Some only do "must do" trainings in the framework of their Sino-foreign projects, others do self-financed trainings in order to get in touch with potential project owners and source projects. CDM Centres also publicise CDM handbooks which complement the trainings. These handbooks have been similar in their content and include normally an introduction to climate change, the Kyoto Protocol and the CDM, an overview about the current Chinese CDM institutions, regulations and registration procedures, and outline CDM potential of sectors of the respective province.

The results of the study on this phase of market development show the greatest deviation from the original hypothesis. Instead of targeting all market participants, trainings were conducted mainly for project owners and governmental officials. Financial institutions were invited, but apparently showed no interest in attending. Other existing or potential CDM project developers were not invited, probably because they are regarded as competitors. Instead, staffs of CDM Centres often were participants of CDM trainings themselves and thus were able to increase their own CDM project development capacity (see graph 6 below).

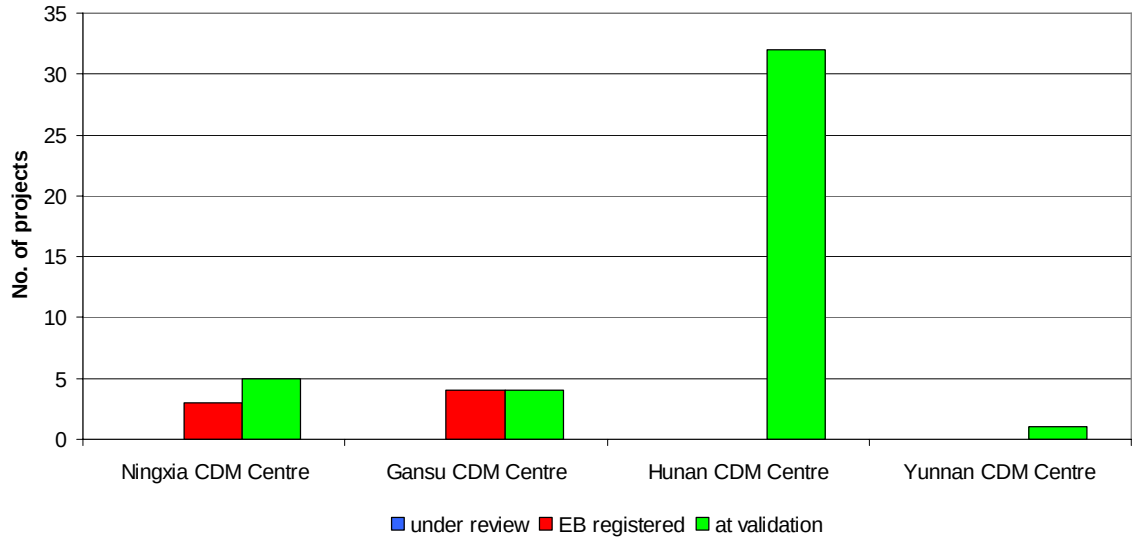
Graph 6: Increase in CDM projects developed by CDM Centres



Source: Based on UNEP Risoe October 2007

Not all interviewees were convinced by the CDM project development capacity of the CDM Centres. These doubts were expressed by two categories of respondents: a) project owners from Yunnan and Hunan, who believed that the centres' experts could only apply well easy methodologies for e.g. hydropower projects, but would outsource more complicated project types to researchers; and b) local project developers, who raised this point as well and in addition questioned the efficiency of a semi-governmental institution. One way for having a quantifiable assessment of this issue is by checking CDM projects developed by CDM Centre for their registration status (see Graph 7). Although none of them has so far been asked for review by the EB, some projects from Hunan apparently have been asked for review by the Chinese DNA.

Graph 7: Comparison of CDM projects under review, EB registered and at validation stage



Source: Based on UNEP Risoe October 2007

4.3. CDM market regulation

CDM Centres are actively advising the provincial government, which in some cases has initiated special political support for the CDM at provincial level. As a note of explanation on the possible scope of regulation it has to be mentioned that the political mandate for CDM-related policy making and the whole CDM project approval process in China lies with the central government. The scope for influencing provincial CDM policies is thus limited by the mandate of the provincial government to draft such policies. Possibilities at the provincial level for political support for the CDM include "soft" measures such as attendance of high level officials at CDM conferences, statements and notes of government officials supporting the CDM, and provincial-level CDM research projects. "Hard" measures for CDM support by the provincial government might be inclusion of CDM-related targets in the provincial planning documents like the Five-Year-Plans or other forms of provincial-level regulations.

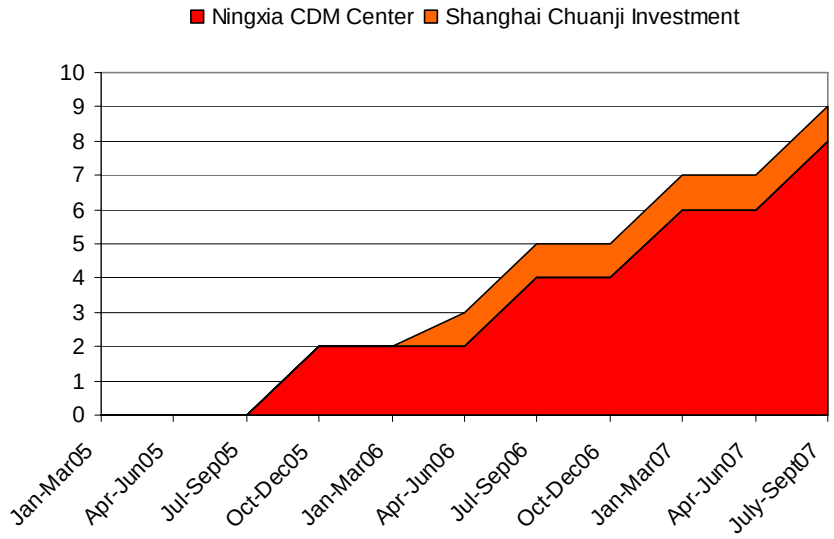
In the four provinces analysed, the observable political support for the CDM has mainly used "soft" measures, e.g. in Gansu three departments of the provincial government have issued a joint declaration for the support of the CDM. However, interviews with market participants, and especially with the representatives of the provincial government and the CDM Centres, revealed that these often assign a much broader influence to the CDM centres than is detectable from official documents. According to these qualitative statements, provincial government positions on general climate change-related or emission reduction-related statements can be traced back to the CDM centres' activities, which include personal talks and official reporting to the relevant departments.

4.4. CDM market commercialisation

Probably the greatest contribution of CDM Centres to CDM market development is the CDM project development conducted by themselves. This is their core activity. The timeline based on the UNDP Risoe Centre CDM pipeline allows an assessment

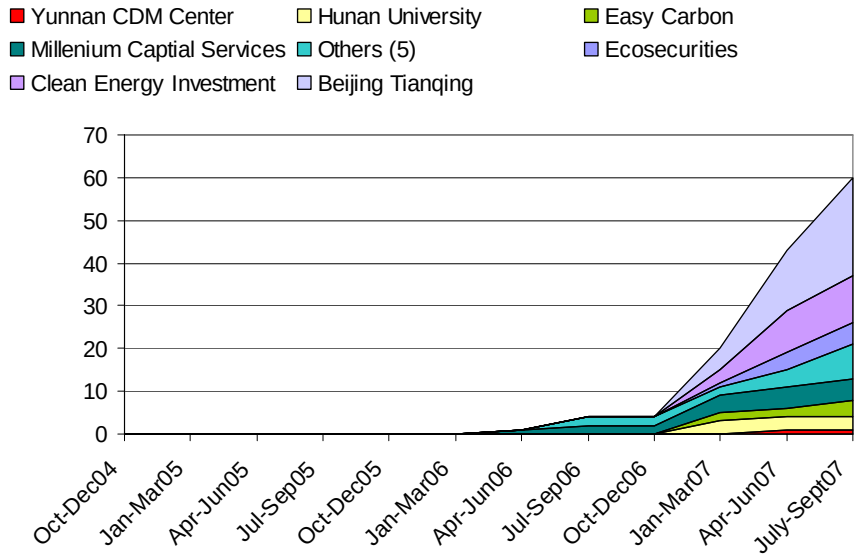
of market transformation in terms of no. and type of projects and allows for a comparison of the centre's performance in CDM project development compared to private consultancies. The timeline for four case studies reveals that the CDM Centres differ greatly in their ability to source and develop CDM projects if compared to private actors (see graph 8 and 9 below).

Graph 8: Market position of Ningxia CDM Centre in terms of no. of developed projects



Source: Based on UNDP Risoe October 2007

Graph 9: Market position of Yunnan CDM Centre in terms of no. of developed projects



Source: Based on UNDP Risoe October 2007

There is a correlation between early market entry and no. of projects developed: Ningxia, the first CDM Centre which was already on the market in 2004, has full market monopoly (the project developer Shanghai Chuanji was founded by the centre's director). The Gansu and Hunan centres have a middle-sized market share,

but show different tendencies: while the Hunan centre is quickly increasing its market share, due to a “aggressive marketing strategy” as stated by many interviewees, the Gansu centre is loosing its market grip, maybe because its competitors set up Gansu-based offices, which increases competition. The Yunnan CDM Centre has only a marginal share in the market, and one interviewee stated that “potential hydro power projects are already under contract with other developers”.

From the qualitative interviews, another explanation can be derived: the ability to trust seems to be fundamental to project owners when deciding with whom to cooperate. Because project owners tend to trust governmental institutions – CDM Centres – more than private companies (not in Yunnan, see 4.2.), this might be one more explanation for a better performance of CDM Centres with regard to project development in comparison with their private competitors. This might be because most of them felt relatively overburdened by the complex CDM requirements (this reason was always given as the first point when asked about the CDM’s disadvantages), which is not their core business and in which they were not willing/able to invest much time and effort. Interpreting these responses one could say that project owners were not able and willing to make fully informed decision about the best choice of project developer and thus turned towards an emotional decision.

CDM centres do not directly lobby with financial institutions, although there would be a high need for more CDM awareness among financial institutions as these tend not to take CER revenues into loan considerations. Instead, project owners complain that they often have to explain the whole CDM procedure to the banks themselves.

4.5. CDM market diversification

The CDM centres are not very active when it comes to market diversification activities. There is no systematic approach of diversifying the market, and this seems also not to be seen as a mandate. All representatives of the CDM Centres have heard about the emerging VER market, and modified CDM project types such as the Gold Standard or other voluntary project standards. The Gansu and Hunan Centre also include information about the VER market and its requirements in their trainings, but response from project owners has been limited so far. None of the centres has become active in own CDM methodology development. Reasons given were lack of time and finance, but also lack of capacity.

CDM Centres become active in two categories of research: Firstly, research on how to implement the central government’s “energy saving and emission reduction” policy at the provincial level. This kind of research seems to be a contribution of the CDM Centres demanded by the provincial government, e.g. the Hunan CDM Centre has set up an extra branch which only does research on this topic. Secondly, CDM Centres become active in research which is financed by Sino-foreign donor projects, e.g. the Ningxia CDM Centre is already in phase three of a UK project on assessing the effects of climate change on Ningxia’s agriculture.

CDM Centres have some influence on the CER seller and purchaser demographics. Due to the current demand-driven CER market in China, Centres have a relative large choice of buyers for their CERs, and they increase their choice by attending international conferences (e.g. Carbon Expos) and by setting up sub-branches in

Beijing, where they are closer to the buyers. In turn, they can also increase their choice of project owner, because some of them now turn to other provinces to source new CDM projects, e.g. the Hunan CDM Centre has a cooperation agreement with the Anhui CDM Centre to mutually develop projects in Anhui province.

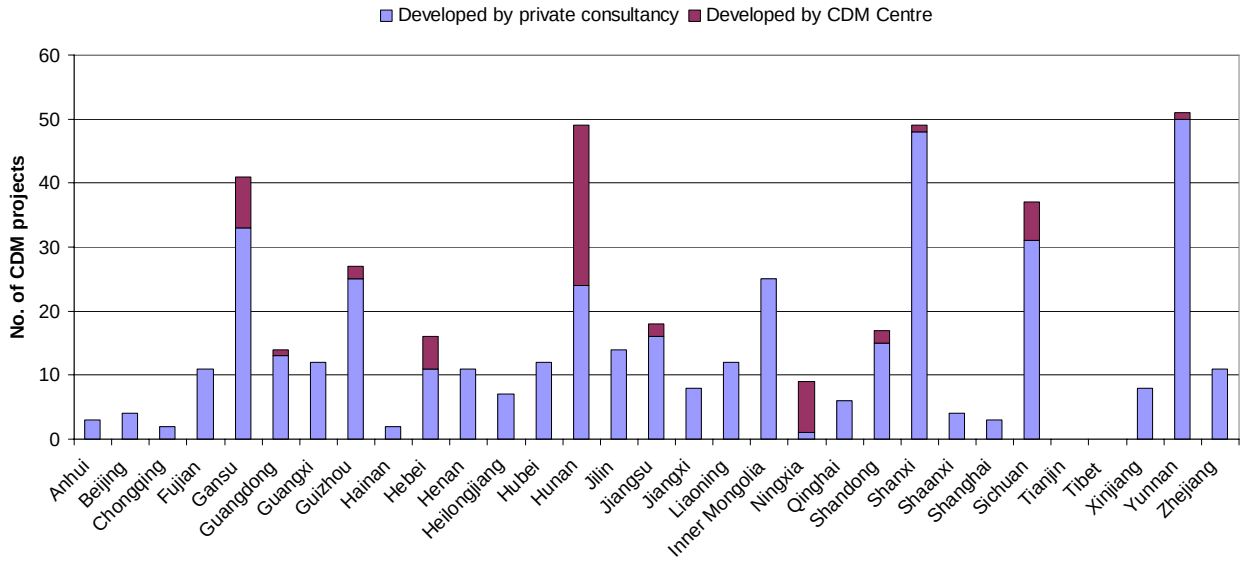
IV. Discussion of results

1. CDM Centres as market facilitation organisation

The CDM Centres had a verifiable impact on the first three phases of market development: Firstly, their information dissemination via publications and conferences contributed to a dissemination of information on the CDM. Secondly, the centres' trainings and their learning-by-developing-projects approach helped project owners to understand the CDM requirements, judge their project's CDM eligibility, increased their ability to use the CDM as a leverage in loan negotiations, and has – a surprisingly important issue – increased trust in an international mechanism which was regarded first as a "cake falling from the sky" that nobody would dare to believe in. The trainings were however not able to reach representatives of financial institutions, which were invited but did not attend the events, assumedly due to a lack of CDM recognition by their banks. Most contrasting to the assumptions of this research, the trainings of the CDM centres were not at all targeting other project developers. While representatives of CDM centres always assured that other project developers in their provinces would be welcome, they also stated that these were eventually competitors. One fundamental conclusion is therefore that the CDM centres have had no impact on CDM capacity development for one important segment of the market - other project developers.
Thirdly, trainings and conferences helped also to create awareness on the CDM among local government officials. Most of the CDM Centres also used their standing as sub-departments or government affiliated entities to use the official communication channels within a provincial government to provide CDM information and policy suggestions to their superiors. Besides personal interaction, this took the form of writing reports. Officials from the provincial government thus often supported the Centre's work, lifted the CDM on the political agenda, and eventually drafted notes, reports and policies supporting the CDM project development in their province. This in turn had a positive effect on project owner's trust in the CDM as these generally take a governmental back-up of an issue as a sign of its trustworthiness.

The impact of the CDM centres on the market phases of commercialisation and diffusion is only clearly verifiable for one indicator: no. of CDM projects developed. While a monopoly on the market by the centre is only existent for Ningxia, there are some other CDM Centres which established themselves as successful project developers (see graph 10 below).

Graph 10: CDM project development by all 27 CDM Centres



Source: Based on UNEP Risoe October 2007

Evidence for impacts on the commercialisation and diffusion phase of market development remains weak: CDM centres do not engage in methodology development, but they start to include information on the VER market in their publications, websites and trainings. When asked about their future strategy for business development, representatives of the CDM centres mainly want to expand their PDD services, e.g. by entering either new sectors in their own provinces or by sourcing projects in other provinces. One concern of them was also to go beyond PDD development and enter the international carbon market as CER traders or even of becoming buyers to their own projects by establishing joint ventures with foreign companies. Most of them regarded the time for CDM capacity development in their province as coming to a closure, instead focusing now on the CDM business. However, some of the CDM centres are offering CDM trainings for externals: the Hunan CDM Centre has a cooperation agreement to train staff of the Anhui CDM centre; and the director of the Ningxia CDM centre is even thinking about offering his training and PDD development services in Russia and in African countries.

2. Methodological issues

This study faced several challenges on the methodological side. Probably the largest barrier for the empirical part of the project was getting access to interview partners in departments of the central and local government, and at financial institutions. Project owners and consultancies, which tend to be small- to middle-sized enterprises, were easier to approach. A lack of mandate – the author was only a PhD student - and a lack of time and resources were reasons for a limited sample, in average 10 interviews per province, which certainly limits the degree to which findings can be generalised. Besides these general restrictions, the research experienced two main challenges: 1. the assessment of an ex-ante project situation without any baseline data; and 2. the general difficulty of measuring impacts of capacity development activities on market development.

In order to be able to do a comparison of CDM awareness and capacities, ideally a baseline prior and after intervention should be available. As no data was available for

the case studies, an ex-post assessment of the CDM awareness and capacities of three groups – potential project owners, government officials and financial institutions – was tried by asking representatives of two of these groups – project owners and government officials[1] – to assess the 2005 and the 2008 situation of their peers and the other two groups. The degree of correctness of these subjective assessments is debatable, because a) memories of trainings' timings, composure and contents tend to become shallow with time, and b) personnel within the CDM business has a very high fluctuation so that current staff often has only recently started within the company/department or even in the CDM business itself.

The impact on capacity development by the CDM Centre was measured directly by the number and size of trainings delivered and indirectly by a) an assessment by peers about their group's increase in CDM awareness, knowledge and capacity, and b) by an analysis of the increase of the groups' CDM-related outputs like number and quality of developed CDM projects or number of CDM-supporting policies by local government officials. Evidence of a causal connection between these groups' outputs and the trainings received stays however anecdotal.

Another difficulty has been the assessment of the explanatory power of alternative explanations for market development, e.g. how to weigh the relevance of CDM trainings conducted by the CDM Centres versus trainings conducted by industry associations.

V. Conclusion

This study has shown that provincial CDM centres have had an impact for launching and for consolidating their provincial CDM markets, but their impact on maturing markets by diversifying these is low. The centres' focus on providing information to project owners and the exclusion of project developers form CDM trainings leads to the conclusion that CDM Centres act not as market facilitating institutions but mainly as CDM project developers. This tendency is confirmed by statements of CDM centres' representatives who see the expansion of their PDD development services as their future business development strategy. While these tendencies are not in line with theoretical concepts of market facilitation organisations, they respond to the objectives of the donors' capacity development projects, which are also mainly focused on the development of PDDs and the generation of CERs. One the other hand, private actors, e.g. project developers, buyers and even DOEs, have launched their own CDM trainings in the provinces. Although they do this with the goal of reaching out to more potential project owners, they thereby contribute to provincial capacity development. This observation contrasts the theoretical assumption that mainly public actors are responsible for capacity development in emerging markets.

What can thus be learned from the Chinese experiences for other countries which have local capacity development needs for their full participation in the CDM? Probably this depends to some degree on the transferability of a very Chinese feature of the provincial CDM Centres to other countries: they have been "Shiye danwei" (事业单位), privately run companies that serve the government for providing public services. Government back-up and the possibility to use government channels

[1] Representatives of local financial institutions were not available for interviews.

for information dissemination and contacts to project owners are their competitive advantages to private consultancies.

India has probably made similar experiences with a comparable approach: “Nodal agencies”, which are also sub-branches of governmental departments at the state-level, have been appointed for CDM promotion at the local level. Despite their different political system, both countries have opted for a “top down” approach of setting up local level CDM market facilitation institutions. Interesting for future research would be a comparison of these “top down” approaches with countries or regions that pursue a “bottom up” approach, in which institutions can compete for the status of a “CDM Centre”, which then is awarded with governmental support and donor financing. Actually, two Chinese provinces have such “bottom up” approaches of setting up CDM Centres: in Sichuan, two independent CDM Centres emerged as competitors; and in Guizhou, the CDM Centre was selected via a tender procedure initiated by the donor (UK) among several competing institutions. Although setting up Centres for local CDM market facilitation is a replicable model, there is still scope for improving the approach.

VI. References

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- 6 donor countries and organisations active in provincial CD4CDM projects
- 3 DOEs (two operating ones, one applicant DOE)
- 9 Beijing-based project developers
- 4 Beijing-based buyers,
- 4 representatives of the NDRC, ACCA 21, and SEPA
- 7 representatives of the Ningxia, Gansu, Hunan and Yunnan CDM centres
- 4 representatives of provincial Science & Technology Departments
- 1 representative of a provincial Development and Reform Commission
- 2 representatives of a provincial Environmental Protection Bureau
- 11 project owners
- 5 province-based project developers (only one of them had no Beijing-based headquarter)
- 2 province-based NGOs (one local grassroots organisation, one international NGO)
- 2 researchers from provincial universities